



**Interoperability**  
headed for Colorado  
SEE PAGE 28



**Family Radio**  
subject of ITA protest  
SEE PAGE 40



**New portables**  
track down workers  
SEE PAGE 54

INFRASTRUCTURE • APPLICATIONS • SECURITY • SAFETY • INTELLIGENCE

# MRT

**MOBILE RADIO TECHNOLOGY**

The Official Magazine of IWCE

# 700 MHz MONOPOLY?

A single band manager supervises the 700 MHz spectrum.  
That company has a single customer. Is this a marketplace?  
A partnership? Or just bad business?  
The answers begin on page 14.

NOVEMBER 2002

**Double Feature: Federal security**

**Exclusive:** Donald E. Koehler reports on the FAA's recertification of the Anchorage airport and the role of mobile communications in federal disaster preparation.

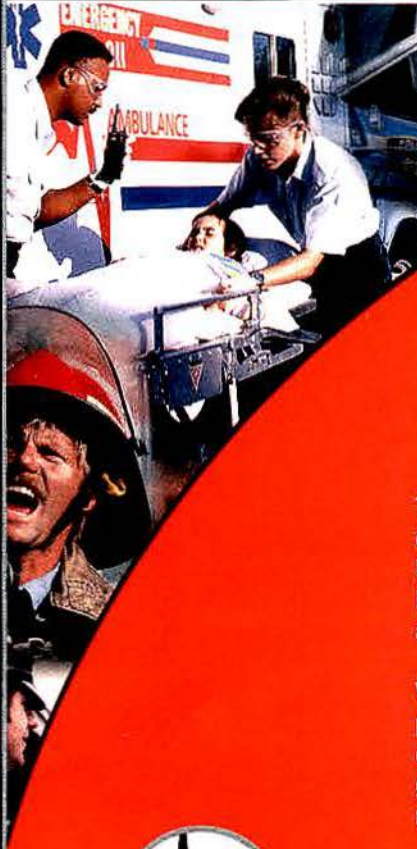
**WWW.IWCE-MRT.COM**





**Vertex Standard**  
We make a difference

## PICK A PAIR OF PORTABLES



That's right, now is your chance to sample not one, but two Vertex Standard USA Portable Radios, designed specifically for the variety of Public Safety applications that you encounter on a regular basis.

Whether you need 5 or 500 channels, we can provide the radio to cover all of your critical communication needs. We offer the fastest growing product line in the industry and we just made it even easier for you to try us on for size.

With loud 700 mW audio, to invertible displays to emergency and encryption, our radios are easy to use, easy to program and built tough for dependability, even under the harshest and most demanding situations.

If you are ready to experience the latest in portable radio communications, at no charge, and your Agency uses at least 50 2-way radios, then **we invite you to try two free portable radio samples.**



**VX-510 / VX-520**

designed by Public Safety professionals for Public Safety professionals with a rugged cast metal frame, super high capacity / long life battery, 32 channels and available in VHF, UHF and Lowband



**VX-800**

this model packs a Punch with 200 channel capability and an advanced 8 character invertible alphanumeric display, this is the perfect Public Safety choice



**VX-600**

user-friendly, flexible and rugged, all in one die-cast chassis, with 48 channels that can be managed in up to 3 memory groups and an extended battery life, with loud 700 mW audio output



**VX-900**

the radio that redefined portable communications for Public Safety applications, with 512 channels, capable of emergency, encryption and embedded messages as well as loud 700 mW audio output

Contact us toll-free at

**1-800-283-7839**

Extension 2200

or e-mail us at

**[vertexstandard@vxstdusa.com](mailto:vertexstandard@vxstdusa.com)**

for details on our Pick A Pair Of Portables,  
the latest offering in our  
**Public Safety Demonstration &  
Evaluation Program.**



**In the world of  
Wireless Networks  
M/A-COM delivers  
the best in  
private radio  
solutions.**

**EDACS<sup>®</sup>**

**OpenSky<sup>®</sup>**

**NetworkFirst**



Total communications solutions.  
Interoperability. Serving public safety,  
utility, industrial, commercial, and  
government organizations worldwide.

**tyco**  
Electronics

**M/A-COM**



# MRT NOVEMBER

**MOBILE RADIO TECHNOLOGY**  
The Official Magazine of IWCE



## Features

- 14 Cover Story: 700 MHz Monopoly?**  
Don Bishop
- 28 Executive decision**  
R.A. Jetter  
Uncle Sam brings a gift to Colorado
- 40 Family Radio more than a name**  
Don Bishop  
ITA argues with FCC over business use of FRS
- 48 Don't call it a comeback**  
Donald E. Koehler  
Anchorage airport earns recertification — with a little help
- 52 Weapons**  
Donald E. Koehler  
Mobile communications provide emergency assist
- 54 Where are they now?**  
R.A. Jetter  
Track public safety workers with portable two-way radios

## Departments

- 4 Making Waves**  
Bill McCarthy
- 6 News**
- 60 Product Focus**  
Power supplies
- 62 Products**
- 65 Ad Index**
- 65 Classifieds**

On the cover: Photo of Mark Crosby by Maximilian Franz, *Daily Record*, Baltimore.

Mobile Radio Technology, Volume 20, Issue 11, ISSN 0745-7626 is published monthly by PRIMEDIA Business Magazines & Media Inc., 9800 Metcalf Ave., Overland Park, KS 66212 (primediabusiness.com). Periodicals postage paid at Shawnee Mission, KS, and additional mailing offices. Canada Post Publication Mail (Canadian Distribution) Sales Agreement No. 40597023. Current and back issues and additional resources, including subscription request forms and an editorial calendar, are available on the Web at [www.mrtmag.com](http://www.mrtmag.com).

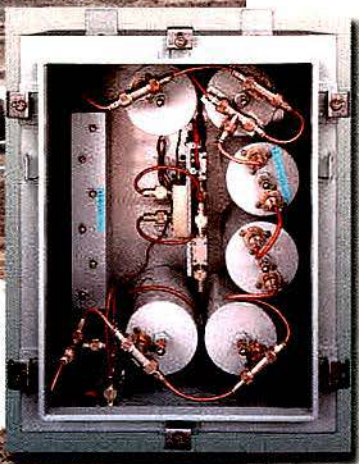
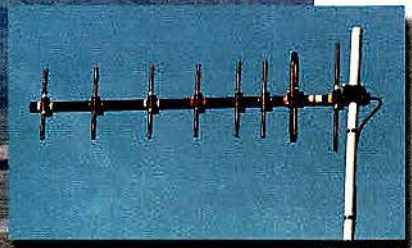
**SUBSCRIPTIONS:** Mobile Radio Technology is mailed free to qualified subscribers within the United States and Canada. Non-qualified subscribers may subscribe at the following rates: United States: one-year: \$35; Canada: one-year: \$45. Qualified and non-qualified subscribers in all other countries: one-year: \$45 (surface mail); \$90 (air mail). Subscription information: P.O. Box 12960, Overland Park, KS 66282-2960.

**POSTMASTER:** Send address changes to Mobile Radio Technology, P.O. Box 2100, Skokie, IL 60076-7800.



# "COMING THROUGH LOUD AND CLEAR ..."

- Antennas
- Combiners
- Wattmeters
- Duplexers
- Filters
- System Design



## FORMER WACOM CUSTOMERS:

Telewave can support Wacom commercial and amateur products. Many Telewave products share a common design heritage with Wacom, and most of our cavity and isolator products are drop-in replacements for Wacom. We can repair, rebuild, and expand most existing Wacom items or systems without a complete change-out.

Telewave, Inc. delivers high performance ... everywhere, everytime.

We bring 30 years of product engineering and system design expertise to the table for every customer, large or small.

With a full line of standard products, and the ability to quickly create custom designs for special projects, Telewave provides unmatched support for Public Safety, Government, and Business radio systems.

Call us today at 1-800-331-3396, and discuss your requirements with our expert sales engineers, or visit us at [www.telewave.com](http://www.telewave.com)

Telewave, Inc.  
660 Giguere Court  
San Jose, CA 95133

Wacom is a registered trademark of Wacom Co., Ltd.

 **TELEWAVE, INC.**   
Radio System Manufacturer since 1972

Circle 5 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)



# Battling the digital zombies

Communications in public safety and business are more critical than ever. Communications is digitizing as the world becomes more hazardous. As the United States moves toward war in Iraq and continues the war against terrorism, we know that the oceans no longer protect us from world events. This is a dangerous time to experiment with communications technology.

I come from the world of the Internet and telecommunications. I was the editor-in-chief of *Boardwatch Magazine*, the now defunct *CLEC Magazine* and the chairman of ISPCON tradeshow conference. The focus was Internet service providers, small telephone companies and the large companies that provide the Internet backbone, many of which may be shipping their executives to prison soon.

The world of mobile radio communications is much like the Internet world, hopefully with fewer executives bound for stone walls and steel bars.

In the Internet industry and the mobile radio industry, there are end users who want communications technology to work without knowing how it works. There are arguments over scramblers and encryption, government needs for secrecy, yet responsibilities to the public's right-to-know. There are vendors who try to keep pricing secret – the how-much-you-got folks. There are the problems of legacy networks and integration into emerging digital technologies. There are never-ending questions about interoperability, and the need for standards. And so it goes.

But perhaps, above all, there is the concept of convergence. With the wartime threat to life and the economy, convergence of voice, video and data carries

deeper meaning than providing AOL Time Warner, Disney and all the companies they absorbed with new entertainment and marketing venues. Survival is linked to communications more profoundly than ever.

Competing interests of business, education, the entertainment industry and homeland security, put the decisions of the Federal Communications Commission into a new – perhaps frightening – light. Convergence could save lives; technology errors could cost lives. The stakes are high.

That is why I am thrilled to be in the position of editing this magazine. Demystifying communications, technologies, software and protocols is at the core of our mission. Pointing out trends, facilitating debate, searching for the truth and enhancing public safety as well as business opportunities are implicit in that mission. We will not shy from controversy.

But we do not have to be digital zombies without humor or any sense of providing a bit of entertainment. We will make this magazine smart and entertaining, but above anything else, we will make it useful.



Editor  
bmccarthy@primediabusiness.com  
www.iwce-mrt.com



# Built to Stay In-Service



## Introducing Valmont Communications.

We've combined the best people and products from three industry leaders with the financial strength and business diversity of an international corporation. We deliver the widest selection of guyed, free-standing and monopole towers and components with the Industry's strongest service commitment.

**Valmont Communications -  
Built to stay in-service.**

**valmont**   
COMMUNICATIONS  
[www.valmont.com](http://www.valmont.com)

North American  
Communications  
Facilities:

Valley, NE  
Salem, OR  
Jasper, TN  
Plymouth, IN  
Brenham, TX  
Mexico City, Mexico

Communications Division - Valmont Industries, Inc.

3575 25th Street,  
Salem, Oregon  
97302-1123 USA  
Phone 1-888-880-9191  
Fax: 1-503-363-4613

1545 Pidco Drive,  
Plymouth, Indiana  
46563-4005 USA  
Phone: 1-877-467-4763  
Fax: 1-574-936-6796

Circle 6 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)



# The Hatfield report

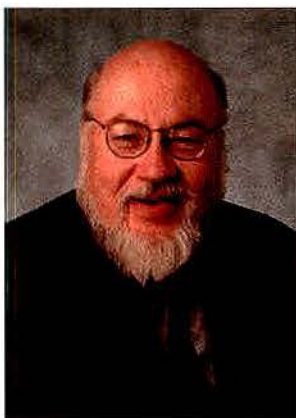
## Former FCC commissioner urges wireless E9-1-1 acceleration

**T**he FCC wants to accelerate deployment of wireless E9-1-1 emergency telephone number service that would indicate callers' locations to call takers at public safety answering points.

In an effort to herd all wireless carriers, equipment manufacturers and PSAP operators into the E9-1-1 corral with less delay than has been evident to date, the FCC commissioned one of its retired bureau chiefs, Dale N. Hatfield, to conduct an inquiry into E9-1-1 technical and operational deployment problems.

Hatfield delivered his "Report on Technical and Operational Issues Impacting the Provision of Wireless Enhanced 911 Services" to the commission on Oct. 15. The next day, the FCC issued a Public Notice that asked for comments about Hatfield's report to be filed by Nov. 15, with reply comments due on Dec. 3.

In its Oct. 16 notice, the FCC said that Hatfield's report notes initially the importance of wireless E9-1-1 for emergency services, the progress that has been made in wireless E9-1-1 implementation during the past several years-especially in the development and selection of technologies for obtaining location information-and the critical role LECs play in implementation of wireless E9-1-1.



Dale N. Hatfield

Hatfield recommended that a "National 911 Program Office" be established within the proposed Department of Homeland Security to coordinate with local and state public safety-first responders and other stakeholders.

Citing the importance of E9-1-1 to the safety of life and property and to homeland security, Hatfield recommended that the FCC maintain or even increase its oversight of the rollout of wireless E9-1-1 services during the next several years.

### Hatfield's ideas

Hatfield recommended that the FCC:

- 1) establish an advisory committee to address the technical framework for the further development and evolution of E9-1-1 systems and services including technical standards.
- 2) continue to urge the creation of organizations at the state, regional, and local levels of government to coordinate

the rollout of wireless E9-1-1 services.

- 3) encourage the creation of a national level clearinghouse to collect, store, and disseminate status information on the rollout of wireless E9-1-1.

- 4) actively coordinate with and support the U.S.

Department of Transportation's wireless E9-1-1 initiative and other efforts to educate state and local governments and PSAPs on the benefits and importance of wireless E9-1-1 services.

- 5) continue to support the efforts of the Emergency Services Interconnection Forum (ESIF) concerning PSAP readiness.

- 6) work closely with individual and state regulatory commissions and their association, the National Association of Regulatory Utility Commissioners (NARUC), in resolving issues relating to LEC cost recovery and pricing.

- 7) urge stakeholders to develop industry-wide procedures for testing and certification of wireless E9-1-1 to ensure that they meet the accuracy requirements specified in the commission's rules.

### Public safety reaction

Three membership organizations that reflect the public safety community's interest in wireless E9-1-1 location capability, the National Emergency Number Association, the

Association of Public-Safety Communications Officials International and the National Association of State 911 Directors, issued a joint statement that applauded Hatfield's report, calling it "thorough and fair."

The joint public safety statement supports what it said was a long-standing position within the public safety communications community that the automatic provision of location information is "critical" for both wireless and wireline calls to 9-1-1.

The public safety organizations said that Hatfield's observations indicated that "technological and operational attention has shifted from discovering and developing wireless E9-1-1 location capabilities to actual deployment."

The joint statement called attention to Hatfield's observation that "PSAPs are on the frontlines in the nation's defense against the threat of terrorism as well as in responding to more conventional emergencies."

### Vendor reaction

One manufacturer, Cambridge Positioning Systems, Cambridge, United Kingdom, weighed in with an immediate reaction to the Hatfield Report.

CPS asserted that the "enhanced observed time difference" industry, in which it plays a part, is "already meeting" the Hatfield Report recommendations on collabora-



# the PERFECT SUBSCRIBER UNIT

If it's tough enough for  
the U.S. Army....

The 'F4TR is MIL SPEC\*,  
sharing many components  
with the IC-F3S, the ICOM  
radio chosen by U.S. Army  
for its Soldier Intercom (SI)  
battlefield communications.



Finally, now there's a radio that's ideal for today's business needs, and offers the capability to grow with tomorrow's technology. ICOM's IC-F4TR offers: 250 channels (selectable wide/narrow by channel); Built-in signalling, including CTCSS encode/decode with reverse burst, DCS encode/decode, and DTMF encode/decode; and a backlit alphanumeric display.

Why invest in equipment  
that may soon be out of  
date? ICOM's rugged  
'F4TR is designed to take  
advantage of expected  
future technology changes.



For tomorrow, the 'F4TR offers: built-in flash memory for quick CPU upgrades; wide/narrow channel spacing; and trunking upgrade paths that grows with your company's communication needs.

3-in-1 selectable  
trunking/conventional radio:

- PassPort® (that works!)
- LTR®
- Conventional

It's the ideal **SMR** unit, designed from the ground up as a trunked radio.

**IC-F4TR** UHF



For free literature, call 425-450-6088.

[www.icomamerica.com](http://www.icomamerica.com)

**ICOM**

FOR PEOPLE WHO MAKE SMART CHOICES

ICOM 5001 8100-2/02 © 2002 ICOM America, Inc. • 425-450-6088 • The ICOM logo is a registered trademark of ICOM Inc. IC-F4TRP1801

Circle 7 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)



tion and standards.

"E-OTD technology is already meeting the FCC's accuracy requirements for 2002, with a filing by operator T-Mobile recently confirming compliant performance," a statement from CPS reads.

The Hatfield Report "is the most thorough and complete assessment of where the E-911 industry is at the moment. We fully support the recommendations and believe that those of us working within the E-OTD industry have already

The CPS official said that the Hatfield report also notes that the future development of a particular location technology would depend on the ability of that technology to deliver commercial services.

"E-OTD again, unlike other alternatives, provides the building blocks for advanced commercial services fully integrated into the GSM system," Wade said.

"The kind of industry-wide collaboration called for in the report is already under way in

## "The kind of industry-wide collaboration called for in the report is already under way in the E-OTD industry ..."

taken many of the recommended steps," the statement quotes CPS Chief Executive Chris Wade as saying.

"The formation of an industry-wide E-OTD working group, backed by all the major equipment and handset vendors, is already addressing issues surrounding systems engineering and best deployment practice. Further collaborative work is also underway on testing and certification methods," Wade said.

Wade said that CPS supports what it said was Hatfield's assertion that standardization is a key aspect for the success of location technologies.

He said that E-OTD, unlike many alternatives, is a "standardized and accepted location technology" that enjoys the full support of the telecommunications equipment and handset suppliers.

the E-OTD industry and yielding positive results. Having met the FCC October 2002 accuracy requirements, we are now seeing considerable progress towards the 2003 levels," he said.

The CPS statement describes the Joint E-OTD Industry Working Group as bringing together senior management and technical expertise from global vendors.

"Up to 1,000 engineering and technical staff from these companies are working on E-OTD," the statement reads. "A second group, involving major handset manufacturers has also been formed in order to further progress E-OTD handset implementation."

CPS described the groups' objective as providing an end-to-end approach to the delivery of the technology involving infrastructure, terminals and network design.



A PRIMEDIA Publication

WWW.MRTMAG.COM

**Editorial Director:** Don Bishop, dbishop@primediabusiness.com  
**Managing Editor:** Nikki Chandler, nchandler@primediabusiness.com  
**Associate Editor:** Denis Storey, dstorey@primediabusiness.com  
**Senior Art Director:** Maurice Lydick, mlydick@primediabusiness.com  
**Contributing Editor:** Donald E. Koehler, AFDEK1@uaa.alaska.edu  
**Contributing Editor:** Patrick Buller, W7rt@msn.com  
**Contributing Editor:** Ernest Worthman, eworthman@primediabusiness.com  
**Public Safety Consultant:** David O. Dunford, Lenexa, KS, Police Dept.  
**Regulatory Consultant:** Robert H. Schwaninger Jr., Schwaninger & Associates, Washington, DC  
**Editorial Advisory Board:** John Abbey, The Abbey Group; Elliott Hamilton, Wireless IT Research Group; Richard P. Biby, P.E., Crown Castle International; Alan Burton, founder, Dispatch Monthly magazine; Gene A. Buzzi, RCC Consultants; Jack Daniel, The Jack Daniel Company; Gary David Gray, P.E., Orange County Communications; Frederick G. Griffin, P.E., Frederick G. Griffin P.C.; Jim Hendershot, Radio Design Group; Samuel J. Klein, Technical Associates LLC; S.R. McConoughey, P.E., Mobile Communications Consulting; Art McDole, Salinas, CA; Tony Sabino, Regional Communications; Robert C. Shapiro, P.E., Strategic Telecommunications; Leon Spencer, ExxonMobil Global Services; Gregory M. Stone, Ph.D., Quantum Radionics; Tom Tolman, National Law Enforcement and Corrections Technology Center; Raymond C. Trott, P.E., Trott Communications Group; William A. Wickline, P.E., Mentor, OH.  
**Vice President:** Margaret Pederson, mpederson@primediabusiness.com  
**General Manager:** Amy Cosper, acosper@primediabusiness.com  
**Publisher:** Darren Sextro, dsextro@primediabusiness.com  
**Advertising Sales Manager:** Joyce Bollegar, jbollegar@primediabusiness.com  
**Advertising Sales Manager:** Jody Geist, jgeist@primediabusiness.com  
**International Sales:** Stephen Bell, stephenbell@email.msn.com  
**Classified Sales:** John Piotrowski, jpiotrowski@primediabusiness.com  
**List Rental Services Representative:** Marie Briganti, Primedia@statistics.com  
**Advertising Services Manager:** Karen Clark, kclark@primediabusiness.com  
**Vice President, Production:** Thomas Fogarty, tfogarty@primediabusiness.com  
**Production Manager:** Melissa Langstaff, mlangstaff@primediabusiness.com  
**Ad Production Coordinator:** Holly Hutchcraft, hhutchcraft@primediabusiness.com  
**Classified Ad Coordinator:** Kristi Knupp, kknupp@primediabusiness.com  
**Vice President, Audience Marketing:** Christine Oldenbrook, coldenbrook@primediabusiness.com  
**Director, Audience Marketing:** Barbara Kummer, bkummer@primediabusiness.com  
**Sr. Manager, Audience Marketing:** Gayle Grooms, ggrooms@primediabusiness.com  
**Customer Service:** 800-441-0294

### PRIMEDIA Business Magazines & Media

**Chief Executive Officer:** Timothy M. Andrews, tandrews@primediabusiness.com  
**President:** Ronald Wall, rwall@primediabusiness.com  
**Chief Operating Officer:** Jack Condon, jcondon@primediabusiness.com  
**Sr. Vice President, Integrated Sales:** Dave Lovinger, dlovinger@primediabusiness.com  
**Sr. Vice President, Business Development:** Eric Jacobson, ejacobson@primediabusiness.com  
**Vice President, Content Licensing & Development:** Andrew Elston, aelston@primediabusiness.com  
**Vice President, Corporate Communications/Marketing:** Karen Garrison, kgarrison@primediabusiness.com  
**Vice President, Finance:** Tom Flynn, tflynn@primediabusiness.com  
**Vice President, New Media:** Alfred Feldman, afeldman@primediabusiness.com  
**Vice President, Technology:** Cindi Redding, creding@primediabusiness.com  
**PRIMEDIA Business-to-Business Group:** 745 Fifth Ave., NY, New York 10151  
**Chief Creative Officer:** Craig Reiss, creiss@primedia.com  
**Creative Director:** Alan Albanian, aalbanian@primediabusiness.com

#### PRIMEDIA Inc.

**Chairman & Chief Executive Officer:** Tom Rogers, trogers@primedia.com  
**Vice Chairman & General Counsel:** Beverly Chell, bchell@primedia.com  
**President:** Charles McCurdy, cmccurdy@primedia.com  
**Member, American Business Media:** Member, BPA International

**REPRINTS:** Contact FosteReprints to purchase quality custom reprints or e-prints of articles appearing in this publication at 877-436-8366 (219-879-8366 outside the U.S. and Canada). Instant reprints and permissions may be purchased directly from our Web site, look for the iCopyright tag appended to the end of each article.

**PHOTOCOPIES:** Authorization to photocopy articles for internal corporate, personal or instructional use may be obtained from Copyright Clearance Center (CCC) at 978-750-8400. Obtain further information at copyright.com.

**ARCHIVES & MICROFILM:** This magazine is available for research and retrieval of selected archived articles from leading electronic databases and online search services, including Factiva, LexisNexis and ProQuest. For microform availability, contact ProQuest at 800-521-0600 or 734-761-4700, or search the Serials in Microform listings at proquest.com.

**MAILING LISTS:** Primedia Business makes portions of our magazine subscriber lists available to carefully selected companies that offer products and services directly related to the industries we cover. Subscriber who do not wish to receive such mailings should contact the Primedia Business subscriber services at 800-441-0294 or 913-967-1707.

**CORPORATE OFFICE:** PRIMEDIA Business Magazines & Media Inc., 9800 Metcalf, Overland Park, KS 66212, 913-341-1300, primediabusiness.com.

COPYRIGHT 2002

PRIMEDIA Business Magazines & Media Inc.

ALL RIGHTS RESERVED.





# Vertex Standard hosts grand opening

**J**un Hasegawa, president of Vertex Standard, Tokyo, is known to quote his father, who gave the company its corporate philosophy when it was founded in 1956.

"Be fast, be different, be daring," Sako Hasegawa, Jun's father, said.

The Vertex Standard management team took this philosophy to heart when they conducted grand opening festivities last month at the company's new U.S. operations headquarters office and warehouse complex in Cypress, Calif.

The company also has an international division office in Miami, and foreign offices in the Netherlands, the United Kingdom and Hong Kong.

## Be fast

When employees toured the new facility on Sept. 18, they learned how the "be fast" principle would be applied. Vertex Standard invested in a state-of-the-art digital telephone network to minimize "hold" time for its customers by alerting the appropriate customer service, technical support or sales management team when a call has been on hold in the queue too long.

"We've installed reader boards on call activity by department in order to better respond to the increasing number of calls received on a daily basis," Todd Crocker, vice president of the Marine and Amateur Divisions said.

The new boards show status of call times not only by department, but also by individual.



Vertex Standard

On Sept. 19, Vertex Standard brought in key customers and reps and accommodated them at the Cypress Marriott hotel a few blocks from the new U.S. operations headquarters. Arriving guests were treated to a poolside reception and evening dinner.

On Sept. 20, guests were taken by shuttle to the new headquarters. They walked on red carpet to enter the 15,000-square-foot building's two-story open atrium, which features a Koi fish pond and an indoor garden filled trees, bushes and flowers and an artificial stream.

Headquarters employees lining the pond, a staircase and the second-story balcony greeted the visitors with an ovation. The atrium, staircase and balcony displayed placards with customers' names to recognize guests from the world over.

## Be different

Vertex Standard has never considered itself a "typical" radio communications equipment supplier, a statement

from the company said. It listed a record of achievements, which it said demonstrated strength in research and development, including what it cited as "firsts" in its three divisions:

### Amateur

- VX-7R, submersible amateur hand-held.

- FT-897, HF/VHF/UHF multimode portable base station (transceiver).

- Mark-V HF 200W all-mode transceiver featuring enhanced digital signal processing and noise reduction circuitry.

### Marine

- Spectrum+ series with DSC (digital selective calling) capability, including enhanced safety features for Mayday transmissions.

- HX460S pocket-sized (3.5 inches tall) VHF hand-held radio that is waterproof to three feet for as long as 30 minutes.

### Land Mobile Radio

- VX-900 series rugged, advanced portable with 512 channels, extended battery life and invertible alphanumeric display.

from the company said.

- VX-4000 series mobile, which offers the same level of ruggedness and highly advanced features and allows a single radio (RF deck) to be controlled by as many as three control heads.

## Be daring

Vertex Standard said that it has embraced "be daring" technology to take it to the next level in providing customer service and satisfaction, and streamlining inventory management and order fulfillment.

"We now have real-time integration throughout the entire worldwide Vertex Standard organization, from manufacturing to inventory to service to sales and distribution," said Scott Henderson, vice president of the Land Mobile Radio Division.

Warehouse Manager John Lynn said that in the few months the new system has been running, improvements in productivity have been realized along with more accurate order fulfillment.



# Telewave marks 30th anniversary

**T**elewave, San Jose, Calif., celebrated its 30th anniversary this year.

Founded in 1972, Telewave operated in two buildings in Mountain View, Calif., until relocating in January 2002 to a new San Jose facility that the company designed.

Telewave traces its roots to work that its president, Ray Collins, conducted in the early 1970s in the San Francisco Bay area to resolve radio interference and to "clean up" antenna sites.

"Collins' leadership is the driving force behind Telewave, and the company developed a reputation as a provider of high-quality, interference-free communications for SMR and repeater customers," said Will Galloway, a Telewave spokesman.

More recently, a large part



Telewave

of the company's success and continued growth has resulted from close relationships with public safety agencies, including the California Highway Patrol, the California Division of Forestry, the Nevada Highway Patrol and the Federal Aviation Administration. Telewave also works with the U.S. Navy, the U.S. Air Force, the U.S. Coast Guard and the Canadian Coast Guard.

"The company also devel-

ops and maintains new markets," Galloway said. "In the Philippines, Telewave combiners and antenna provide the backbone for wireless local loop radiotelephone systems, and the company has aggressively expanded its presence in overseas markets by appointing authorized distributors and agents in more 100 countries."

Galloway noted that, even during the downturn in the economy, Telewave focuses on

customer satisfaction and support. He said that system engineers are on call to handle emergencies.

Galloway added, "The recent move allows us to offer even better service to customers and allows them to take advantage of greater efficiency in operations, improved collaboration between sales, engineering and production and high-speed networking facilities to allow rapid, CAD-based design."

## Kenwood takes steps to improve financial results

**K**enwood Corp., Tokyo, has negotiated agreements with lenders, investors and labor, and has completed a two-month round of layoffs. Together, the steps were expected to fund future growth, reduce operating expenses and eliminate the \$137 million negative net worth that the company reported as of March 2002.

The company reported a loss of \$215 million on \$2.44 billion in sales for the fiscal year ended March 2002; a loss of \$176 million on \$2.45 billion in sales for 2001; and a loss of \$9.6 million on \$2.6 billion in sales for 2000.

Kenwood said that a Sept. 26 collective bargaining agreement with its union workers included a 15% salary cut that became effective this month.

Kenwood said that the employee reduction alone had put the company on course to

eliminate its negative net worth by March 2004, but the conversion of debt to equity and the issuance and sale of additional stock to current and new investors would accelerate the improvement in its financial condition.

The company said that Asahi Bank, Kenwood's principal lender, has agreed to exchange \$202 million in debt for preferred stock and to extend a \$161 million line of credit.

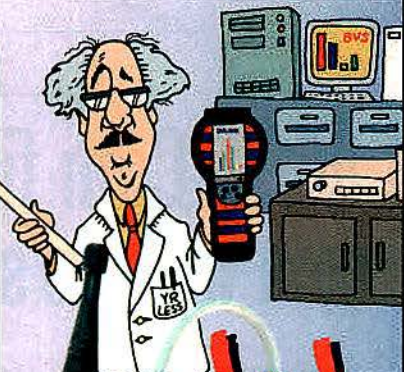
Kenwood said that its largest shareholder, SPARX Asset

Management Investment Trust Co., a Japanese direct investment management company with headquarters in Hamilton, Bermuda, and Merrill Lynch Investment Managers Company, Plainsboro, N.J., have agreed to underwrite a \$16.1 million common stock increase for Kenwood. Through an allocation to third parties, the two companies will purchase the stock using several mutual and other investment funds that they own or manage, enabling Kenwood to increase its capital.



# Wireless Testing Equipment

Designed, manufactured, sold and serviced by Berkeley Varitronics Systems



## WIRELESS LAN

### Yellowjacket™ 802.11b Modular Analysis System

- Spectrum Analyzer displays ALL 14 DSSS channels
- All STAs and APs measured by Berkeley's custom receiver providing RSSI and Packet Error Rate usage/breakdowns
- True Multipath (chip delays) analysis
- 802.11b Security monitoring through MAC authorization lists
- Ideal for WISPs and "Hot Spot" installers
- Optional direction finding antenna for pinpointing "hackers" and sources of interference
- Works with all Compaq iPAQ® Pocket PC® 3700, 3800 and 3900 series

**NEW** Bird's Eye™ Software  
Real-time indoor W-LAN mapping solution

### Locust™ 802.11b Receiver W-LAN Drive-Study Analyzer

- Measures 2.4 GHz coverage for direct sequence (DSSS) wireless networks (IF wideband 22 MHz)
- Internal 12-channel GPS receiver geo-stamps every measurement to removable 32 MByte Compact Flash™ storage

[www.bvsystems.com/wlan](http://www.bvsystems.com/wlan)

## INDOOR/OUTDOOR MICROCELL The Mongoose™ Signal Strength Meter

- Ideal for quick indoor sweeps by propagators
- Internal memory stores signal strength that can be output to a PC with a serial cable

### The Lizard™ 1 Watt Portable Transmitter

- Continuous Wave or modulated (on certain models) stimulus transmitter • Battery operated
- Ideal for W-LAN set-up and evaluating network performance • Includes remote control

[www.bvsystems.com/microcell](http://www.bvsystems.com/microcell)

## DRIVE-TEST & WALK-ABOUT PROPAGATION ANALYSIS

### The Coyote™ Dual Modular Receiver

- Measures RF propagation coverage and detects "RF Shadows"
- Dual modular receivers and 12-channel GPS allow users to swap various bands while in the field
- High measurement rate, more than twice of Dr. Lee's recommended 40  $\lambda$  plus distance averaging
- Removable, rechargeable Li-Ion battery system
- Removable 32 MByte Compact Flash™ memory system

### The Gator™ Class A Transmitter Series

- Generates stimulus signals used to position antennas, set power levels and validate coverage.
- Power control in 0.1 dB increments • CE approved & FCC Type Accepted • Remote controllable

[www.bvsystems.com/drivetest](http://www.bvsystems.com/drivetest)

We accept...



We are a  
Valued Added  
Reseller for...

**symbol**

**BERKELEY**  
**VARITRONICS SYSTEMS** WIRELESS PRODUCTS  
Since 1973

Liberty Corporate Park, 255 Liberty St., Metuchen, NJ 08840

Phone: 732-548-3737

[www.bvsystems.com](http://www.bvsystems.com)

Fax: 732-548-3404 • E-mail: [info@bvsystems.com](mailto:info@bvsystems.com)



Frequencies Available: CDMA 2000 • 3G • CDMA • IS-136 • IS-95B • 1XRTT • GSM • LMR • IDEN/SMR • CELLULAR • PAGING • ISM • PCS • WCS • IEEE 802.11b • MMDS • LMDS • WLL



# M/A-Com financials lost in Tyco's shadow

**T**yco's size shrouds M/A-Com's land mobile radio financial results. M/A-Com, Lowell, Mass., makes land mobile radio equipment and systems, and is a part of Tyco International, a diversified Pembroke, Bermuda-based conglomerate.

On Oct. 24, Tyco International announced a net loss of \$9.1 billion on sales of \$35.7 billion for the fiscal year ended Sept. 30. The company did not provide a breakdown of figures for M/A-Com, but Tyco International listed an "internal" profit of \$1.5 billion on \$10.5 billion in sales for Tyco Electronics, the Tyco International subsidiary of which M/A-Com is a part.

Including M/A-Com, Tyco Electronics has 54 divisions, subsidiaries and brands. M/A-Com itself breaks down into four business units: Integrated Semiconductors, Components, Aerospace & Defense and Wireless Systems.

At the time Tyco Electronics acquired land mobile radio manufacturer Com-Net Ericsson Critical Radio Systems in May 2001 and placed it with the M/A-Com Wireless Systems business unit, M/A-Com's land mobile radio business was estimated at \$60 million in annual sales, with Com-Net at \$300 million.

"The electronics business continued to be negatively impacted by further softening of demand in the telecommunications end markets the company serves," a statement from Tyco International about the Tyco Electronics subsidiary's financial results reads.

The sale of land mobile radio equipment and systems is estimated to form about 1 percent of Tyco International's business.

Tyco International had been rocked by the departure earlier this year of its former chief executive, L. Dennis Kozlowski, who left ahead of charges of tax evasion. Tyco International hired away Motorola's president, Edward Breen, to take the helm. The departure of other top Tyco International executives followed.

Since then, Kozlowski and Tyco International's former finance chief, Mark Swartz, have been charged with stealing \$170 million from the company and using fraudulent stock sales to obtain more than \$430 million.

Tyco International has been auditing its business for evidence of fraud. David Boies, an attorney hired to oversee the audit, said during a conference call about the 2002 fiscal year financial results that although a forensic accounting investigation of Tyco International's books was only 60 percent complete, the review was not expected to reveal massive fraud.

## Briefs

*The Anoka County Union*, Anoka, Minn., reported that the Anoka County Board approved a \$10.5 million bond issue to upgrade the county's public safety communications system. The upgrade includes construction of two new towers to supplement the existing six towers and expand the coverage of the system to the northeast part of the county, and the purchase of new transmitters and receivers. The county has hired GeoComm, St. Cloud, Minn., for engineering consulting services.

*The New Britain, Conn., Herald Press* reported a dispute over a 180-foot tower set for construction at Wethersfield, Conn.'s Fire Co. 3 as part of a \$3 million public safety radio communications system upgrade. Residents protested both the exemption from public hearings the city exercised because of the tower's connection with emergency services and the perceived safety issue involving radiation from cell phones and cellular towers. Cellular operator AT&T Wireless has contracted to share the tower, which would abut residential properties.

*Nextel Communications, Reston, Va.*, plans to enter the Wi-Fi business. Laurie Hoyt, Nextel's director of business development, said the company believes that enterprise customers need wireless local area network connection, but many challenges lie ahead for integrating the technology with mobile networks. The challenges range from security to how a customer accesses the network, Hoyt said.

*Officials in James City County, Va.*, would like voters to endorse a new radio system for police and fire protection, estimated to cost \$8 million. The *Newport News, Va., Daily Press* reported that the county's finance manager, John McDonald, said that the county's hopes in the matter "rode on uncomfortable state-budget currents."

*Motorola, Schaumburg, Ill.*, said on Oct. 16 that it expects fourth quarter 2002 sales of \$7.1 billion. The company's previous guidance for the fourth quarter of 2002 was for sales of \$7.5 billion. Investors reacted negatively to the reduced forecast as shares in the company's stock tumbled \$2.25 to close at \$7.85, a 22-percent drop and the lowest price for Motorola stock since 1982. Motorola said it expects sales for the full year 2003 to be \$27.5 billion.

*EFJ, a Lincoln, Neb.*, company best known for its land mobile radio manufacturing subsidiary, the E. F. Johnson Co., Waseca, Minn., has released details about its third-quarter financial results. EFJ posted a \$500,000 profit on \$10.1 million in sales for the quarter ended Sept. 30, compared to a net income of \$64,000 on \$10.3 million in sales for the comparable period last year. EFJ reported a third-quarter gross profit margin of 43%, up slightly from 42% for the comparable period in 2001.



# now a new top **quality** **p25** portable

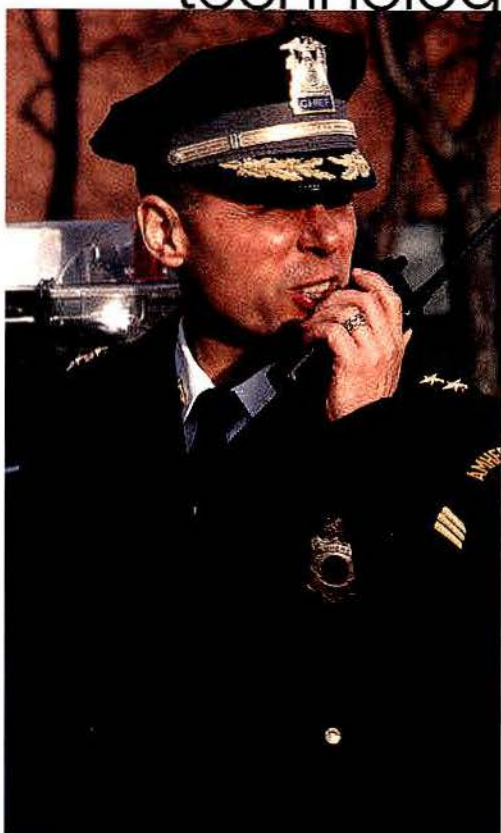
Leading public safety agencies across the U.S. already depend on Kenwood Communications for their two-way radios and radio systems. Now, Kenwood leads the way to digital with the TK-5400 P25 portable. The smallest P25 portable on the market, the TK-5400 is available in both keypad and non-keypad versions and meets or exceeds MilSpec standards. Fully compliant with P25 digital trunking and conventional standards, the TK-5400 has all the user features you need in a rugged, dependable portable.



Circle 9 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)



**digital**  
technology



## KENWOOD

COMMUNICATIONS

Kenwood U.S.A. Corporation, Communications Division  
1-800-950-5005 [www.kenwood.net](http://www.kenwood.net)  
3975 Johns Creek Court Suwanee, GA 30024







# 700 MHz monopoly?

Only one band manager offers spectrum  
for lease and only one customer wants it

by Don Bishop

If anyone could be called an evangelist for spectrum leasing, it would be Mark E. Crosby.

As president of Access Spectrum, Bethesda, Md., Crosby spreads the word about opportunities for a variety of radio communications system operators to lease the company's spectrum for voice and data radio channels. And Crosby is a gambler.

Where Access has found opportunity, many other band managers said that they have been deterred by uncertainty.

They're unsure when incumbent TV broadcasters will vacate the 700 MHz guard band and adjacent spectrum.

They're unsure when the FCC will decide what kind of wireless communications users will occupy adjacent 700 MHz spectrum, a decision that they expect to affect equipment manufacturers' product offers.

They're unsure whether one of their number, Nextel, will exchange its guard band spectrum in a swap that would see public safety users—with somewhat different equipment requirements compared to many incipient business, industrial and entrepreneurial guard band users—constructing new systems on frequencies that then would no longer be licensed as guard band spectrum.

And the band managers have different takes on current equipment availability.

Access, with 21 licenses; Pegasus, with 34 licenses; and Nextel 700 Guard Band, Reston, Va., with 39 licenses; form the "Big Three" band managers.

Of the Big Three, not only is Access the only one to have executed a lease with a customer, it is the only one with a published band plan and a mechanism in place for customers to request leases. Access identified its first and only customer as a radio dealer in Minneapolis, Minn., that has leased 10 12.5-kHz channel pairs "to deploy a Motorola-

Photo by Maximilian Franz, *Daily Record*, Baltimore.



designed, two-way voice and automated vehicle location network."

Crosby once headed the Industrial Telecommunications Association, a membership organization in Arlington, Va., that represents business and industrial radio communications users.

ITA recognized that, since Congress gave the FCC authority to auction spectrum and started counting on auction greenbacks for the national budget, the federal regulatory agency:

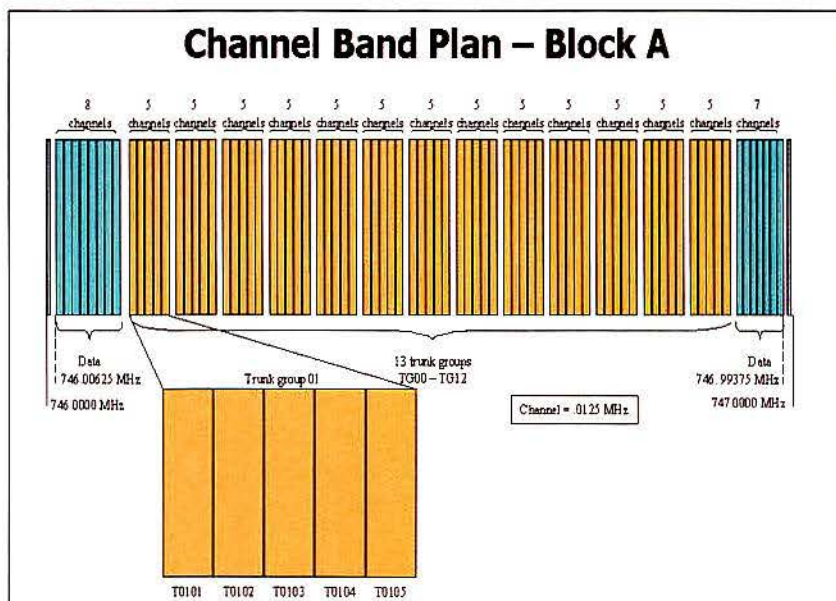
a) was unlikely to devote any new spectrum to the site-specific licenses that for decades had characterized radio communications systems and

b) might facilitate the leasing of spectrum by radio communications users so they wouldn't have to buy spectrum in bulk for geographic areas at auction if

c) the new spectrum could be auctioned to a company that would take responsibility for the leasing and resolution of interference complaints, relieving the agency of an administrative burden.

The timing was just right, and so was the taxonomy: namely, the use of the phrase, "guard band."

Public safety radio users were in the process of winning the right to use 24 MHz of spectrum in the 700 MHz band,



Spectrum bid \$78 million to win 21 guard band licenses in FCC Auctions Nos. 33 and 38. Crosby left ITA in February 2001.

Access Spectrum, one of the "Big Three" band managers, didn't win the most licenses (see related story on page 26), but it engaged Motorola to develop guard band radio equipment and marketed its spectrum while other auction-winning band managers stood mostly idle.

sions, and entrepreneurs who want to build airtime systems to offer communications service to end-users.

"Demand is coming from a lot of places—some private wireless, some subscriber-based, some regional, some national, not only voice, but data. The challenge is to identify and target the demand that can be readily solved with a spectrum solution," Crosby said.

Crosby said that aside from spectrum leasing, a user's options might be limited.

"What is the likelihood of getting an 800 MHz system? Zero. What is the opportunity at 900 MHz? In some places, perhaps some, but in the top 200 markets, there probably isn't any 900 MHz spectrum available," he said.

Crosby recalled receiving a call while at ITA from a large hotel on the Las Vegas strip that had let its 900 MHz license lapse.

"Some people are just watching for licenses to expire, and some are paid to watch. I believe that, within a day, someone applied. The hotel wanted its license back. But when it's gone, it's gone," Crosby said.

"So there's nothing at 800 MHz, and slim pickings at 900 MHz. What about 450-512 MHz? Virtually every place has been raked and groomed to identify FB8 exclusive frequencies. What's the chance of getting decent FB8s with coverage where there is spectrum demand? Very slim," he said.

## "Some people are just watching for licenses to expire, and some are paid to watch."

but they wanted protection from likely interference by future adjacent cellular systems.

ITA proposed that the FCC allocate a "guard band" of frequencies to buffer public safety and cellular systems and auction the guard band spectrum to "band managers" who would populate it with spectrum lease customers using systems designed with non-interference to public safety communications in mind.

The FCC liked the idea.

Meanwhile, ITA decided against becoming a band manager. Instead, ITA formed Access Spectrum, a band manager company. With venture capital funding from the Quadrangle Group and a minority investment from Motorola, Access

Meanwhile, Access Spectrum added to its spectrum inventory by acquiring a combination of 220 MHz licenses from New York-based Aerway, a company that also had contracted Motorola to make suitable two-way radio equipment. Upon Access Spectrum's request, the FCC waived certain rules to give the company the flexibility to lease its 220 MHz spectrum as a band manager.

What's next? Finding customers.

First come the "low-hanging fruit," including the current and would-be radio system operators in urban areas where frequencies have been in short supply, users who lost their licenses through inattention to expiration dates, users displaced by Nextel analog-to-digital system conver-



# Reliability you can count on.

(and never needs walking)



## The VR320 Digital Logging Recorder

Tough and dependable, the Eventide VR320 is the digital logging recorder that you can count on. Emergency call centers, air traffic controllers and financial service providers have relied on Eventide loggers for over 25 years. It is fully controllable from your PC, Internet browser or computer network, yet, because it's a stand-alone unit, the VR320 remains completely operational even when the rest of your system goes down. 48-channel recording, high-capacity internal hard drive, dual DVD archive media and powerful software give you the flexibility to meet your needs and your budget. And since it's an Eventide, you know that it was built and stress-tested right here in Little Ferry, NJ. To find out more, call 1-201-641-1200 or email us at [loggers@eventide.com](mailto:loggers@eventide.com).

# Eventide®

Communication Systems Division

[www.eventide.com](http://www.eventide.com) • 201.641.1200 • email: [loggers@eventide.com](mailto:loggers@eventide.com). Eventide Inc • One Alsan Way • Little Ferry, NJ 07643 USA

EVENTIDE IS A REGISTERED TRADEMARK OF EVENTIDE INC. © 2002 EVENTIDE INC.

Circle 10 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)



And Crosby said that some customers of 800 MHz airtime radio systems, whose previous owners no longer operate such systems, do not want to become users on a national commercial system. They want alternatives for communications.

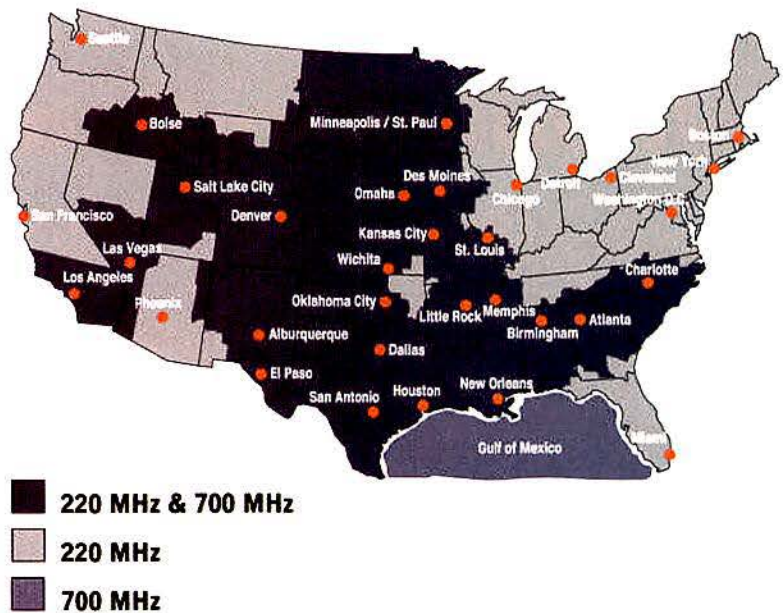
"But where do you put those people? The former system operators advised me that they would like an alternative solution to get some of these customers back," Crosby said.

Another source of demand Crosby identified includes companies and manufacturing facilities that need to upgrade existing radio communications systems.

Crosby broke down the demand for voice communications into three types: two from dealers and one from end-users.

"Dealers want to build subscriber-based trunking systems, and some also have customers who need their own 30-, 50- and 100-unit systems separate from a subscriber-based system. The third type comes directly to us from customers, such as petrochemical companies, utilities and transportation companies that don't normally work through a dealer organization," he said.

Crosby said that demand for data communications runs through all market areas, and the company initially providing



National spectrum coverage.

whether a system is intended to serve vehicular or hand-held radios could make a difference.

"The other thing is that in a top-five city, 700 MHz frequencies may not be available because of incumbent TV stations, so 220 MHz is a great spectrum alternative," Crosby said.

"Last year, the FCC — in its wisdom — decided to let 220 MHz licensees agree-

you may need another, you either take the additional floor or not," Crosby said.

"We do not issue licenses. We issue spectrum-use agreements that define power levels and transmitter locations. We need this information to provide the customer with spectrum integrity and for spectrum management. It's to Access Spectrum's benefit to manage this spectrum extremely well to provide security and integrity to protect customer investments and to maximize the efficient use of the spectrum."

Access Spectrum won't be selling products. Crosby said that spectrum customers who ask about products would be referred to all of the available vendors.

"Virtually all of the private wireless-oriented manufacturers are interested. Would Access Spectrum like more manufacturers involved? Of course. And the likelihood is high. But the first to market has an advantage at 700," he said.

The guard band manager has signed up an initial customer, a radio dealer in Minneapolis, for 10 12.5-kHz channels and a Motorola-designed trunked radio system. That step followed beta testing in Las Vegas with a multichannel, 30-unit system.

As for where Crosby expects other early adopters to activate systems, he said it could be anywhere in the company's spectrum footprint.

"It's possible in the near future that we would announce a multitude of deals, and you might be surprised where

**"It's possible in the near future that we would announce a multitude of deals, and you might be surprised."**

products at 700 MHz and 220 MHz is Microwave Data Systems, Rochester, N.Y.

"I love them. They've stepped up to the plate and are aggressively producing fixed- data solutions. They can design solutions with bandwidths of 100 kHz, 200 kHz or even more, using our 700 MHz spectrum for specific data requirements," Crosby said.

Whether a customer might choose 700 MHz or 220 MHz could depend on propagation, application or location. Signals at 220 MHz tend to travel further, yet antennas on portables are smaller for 700 MHz units, and the higher-frequency signals may penetrate buildings better. So

gate their frequencies for wider bandwidths. Guess what? Now you have equipment and solutions," Crosby said.

When it came to projecting market size and sales, Crosby said that Access Spectrum has numerous customers "in the pipeline," including companies with what he said were critical applications such as a petrochemical facility that might deploy 800 to 1,000 subscriber units within a two-mile radius.

But interested customers cannot reserve spectrum.

"You either lock it in now or it may not be available. It's like leasing space in a building. If you lease one floor and think





Focused Communication Systems

## **We Know How Critical Dispatch Console Systems Are To What You Do.**

We manufacture communications consoles - in fact, it's the only thing we do. And because we're not as large as some companies, we can react to our customers' needs much faster than other manufacturers.

Our dispatch console systems have been selected by some of the largest transportation, utility, public safety and defense organizations in the world. They could do business with any communications company, but they chose Avtec because of the quality of our products and customer service. We also developed custom applications for some of these installations - further evidence that we understand what you need and how to structure systems that deliver on time, every time.

Since we build focused communications systems, all our products are digital multi-line, multi-operator console systems, with all the reliability and flexibility you need - built into every Avtec system we make.

To find out what Avtec can do for your organization, call 803.892.2181 or e-mail [sales@avtecinc.com](mailto:sales@avtecinc.com) today.



4335 Augusta Highway  
Gilbert, South Carolina 29054 USA  
Telephone: 803.892.2181  
Fax: 803.892.3715  
Website: [www.avtecinc.com](http://www.avtecinc.com)  
© 2000, Avtec.

Circle 11 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)



# Motorola reaches into 700 and 220 markets

For prospective users of the 700 MHz guard band and the 220 MHz band, Motorola offers radio communications equipment and, if desired, system-design service.

Ken Notter, vice president of business development for Motorola's Commercial, Government and Industrial Systems Sector, said that the company manufactures the portable and mobile two-way radios and sells a repeater made by Spectra Engineering in Australia.

For trunked operation, the repeater can be staged for deployment with an LTR or PassPort trunking controller. Motorola doesn't offer MPT 1327 trunking as a matter of "span and control," Notter said, explaining that PassPort takes an enormous amount of effort and that the company doesn't want to support multiple protocols.

Motorola wants to make sure it works. Notter said that a given customer's first systems would be staged with Motorola's assistance, and "if they don't want to do that, we won't sell it."

Dealers under Motorola's Professional Radio Dealer contract represent the bulk of the company's two-way radio distribution channel. Notter said that these dealers have the capability to market two-way radio generally, and the guard band and 220 MHz products will add to their opportunities.

He said that Motorola is working with CES, Winter Park, Fla., to develop mobile data products for the portfolio for basic applications such as AVL, status messaging, data messaging and credit card invoicing.

"We're working on the basics first. We have a successful mobile data public safety solution, but we've never focused it on the lower end of data solutions. We're looking to fix that," Notter said.

The company had a natural interest in the guard band spectrum because of the neighboring 700 MHz allocation for public safety radio communications.

"The guard band aspect was a new development. Access Spectrum was an aggressive player and successful in the auction. We work with them on product development to fulfill customer needs where they can provide that spectrum. Because we're so focused on public safety, it made sense to be involved in the guard bands to understand how that is deployed," Notter said.

Motorola owns an estimated 10 percent of Access Spectrum and owns a guard band license for an area that includes New Orleans and Baton Rouge, La. Access Spectrum contracted Motorola to develop FM equipment for 700 MHz.

Separately, New York-based Aerway contracted Motorola to develop FM equipment for the 220 MHz band. Access Spectrum subsequently acquired the bulk of Aerway's 220 MHz licenses and a waiver of FCC rules that permits it to lease 220 MHz spectrum in a fashion similar to that of a guard band manager.

With the guard band, the FCC made available some spectrum for business and industrial use in locations where spectrum otherwise was depleted. Motorola would like to sell 700 MHz systems to large, vertical-market customers and sees some potential for what Notter called "private carriers." Private carriers provide air-time service to end-users.

Large vertical-market customers, such as petrochemical companies and manufacturers, need clean, unencumbered spectrum to deploy with confidence in larger metropolitan areas and in multiple markets, Notter explained. He mentioned universities and airlines among possible customers, saying that in certain markets, there either have been no alternatives or no alternatives of consequence for building new radio systems.

"Challenges with TV station incumbency remain to be worked out. But eventually, the 700 MHz spectrum will be clear," Notter said.

Motorola has other product initiatives that include dual-band 700/800 MHz products, but they represent a different type of product roll-out for public safety use, Notter indicated.

Motorola's guard band product is designed for conventional (single-channel) and for LTR and PassPort trunked (multiple, automatic channel selection) analog FM operation. The dual-band 700/800MHz public safety product is made to the Project 25 digital radio standard.

Immediate 700 MHz guard band use may be limited by TV station incumbency and restrictions in Canadian and Mexican border regions, which might lead a customer to use 220 MHz instead.

Moreover, 220 MHz has greater range, so an equivalent area can be covered with fewer sites at 220 MHz compared to 700 MHz. Antennas on

portable units are larger for 220 MHz, so systems that primarily use mobile units might find 220 MHz doubly advantageous.

Notter said that if a customer comes through Motorola direct sales, Motorola would design the system. If the customer comes through a reseller, Motorola still might design the system under the contract agreement.

"But the reseller could use his own capabilities and design the system. We make design services available for direct and indirect sales. If the sale is on Motorola paper, we'll make sure it does the job, and we'll design the system," Notter said.

Notter demurred when it came to discussing sales projections or financial forecasts. But he said from a trend standpoint, sales would depend on spectrum availability.

"If a customer has a business problem that our equipment and system can solve, it's a matter of matching those two up. Those opportunities fall in the market space. I would expect to see an increase of the smaller type of on-site deployment. There will be some renewed interest in utility marketplace, certainly in 220 MHz," he said.

"And we hope we can open the door back up for what I would call private carrier, SMR-type services in the larger markets particularly where we've been void of a service offer since the middle 1990s. We would like to find a way to bring those services back to market," Notter said.

With respect to pricing, Notter said the 700 MHz and 220 MHz equipment would be found in Motorola dealers' professional series price book. He likened it to a mid-tier product from a reseller's perspective.

**"Challenges with TV station incumbency remain to be worked out. But eventually, the 700 MHz spectrum will be clear."**

*Continued on page 25*



## What they bid for spectrum

Here are the net high bids from the FCC  
700 MHz Guard Band Auction No. 33:

Nextel Spectrum Acquisition	\$337,862,000
Pegasus Guard Band	\$91,498,300
Access Spectrum	\$69,065,775
Dominion 700	\$6,320,000
PTPMS II Communications	\$6,279,000
Motorola Spectrum	\$6,235,000
Black Rock Partners	\$2,547,750
Harbor Wireless	\$42,750
Radiofone Nationwide PCS	\$42,000

they are," he said.

Crosby said that he has learned, during the year-and-a-half Access Spectrum has had its licenses, customers have a variety of strategic and tactical processes to consider before leasing spectrum. He said that their use of spectrum normally is only one part of a business plan that requires resolution of legal, financial, technical and performance issues.

"The sales cycle is longer than we had originally anticipated," he said.

"When I was at ITA, a lot of that work was done before radio users would file their applications. Access Spectrum is involved at an earlier point in the process, and I'll be the first to admit that we have been surprised by all the critical steps that are necessary to pursue before customers agree to deploy an exclusive-use system," Crosby said.

He explained another factor that has changed.

"In the old days, the FCC adopted rules and mandated that certain frequency bands could be used for certain purposes at specific power levels within particular confines - and it was very clear. Not much decision-making was left to the user or equipment supplier," he said.

"With a band manager, customers are provided the flexibility to design a coverage footprint, to aggregate spectrum, to use voice or data, and all that expands the decision process. Greater flexibility has also contributed to the slower pace of decision-making by customers. Eventually, customers will get the hang of it and actually welcome greater flexibility," he said.

He said that he also is finding that Access Spectrum has to provide more spectrum, the company also must provide tactical guidance.

"For example, we might have a customer who wants 10 frequencies at one site. We know immediately, depending on where it is, that the potential loading may range from 500 to 900 units, depending on the kind of users that would be placed on the system. With a little more design work and a little more marketing planning, and if you use the benefits associated with LTR/PassPort trunking, a customer may construct more

than one site. Depending on how the channels are configured, there may be a two-fold increase in system capacity.

"We routinely engage in such discussions with potential customers. We're happy to do single-site, 10-channel systems, but with a little more work, customers can expand the operational possibilities of their systems," Crosby said.

Access Spectrum handles its own fre-

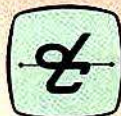
## A SIMPLE COMMUNICATION SYSTEM FOR HIGH NOISE AREAS



Communicating clearly and protecting your hearing in high noise areas is as easy as **1 2 3**. Enhance the performance of your **Two-Way Radio** in loud noise by adding one of our **Noise-Attenuating Headsets** and **Radio Adapter Cords**.

- High quality, rugged Noise-Attenuating Headsets with Certified Noise Reduction Rating (NRR) of 24 dB.
- Over-The-Head or Behind-The-Head style for use with safety caps, helmets, etc.
- Boom-mounted or Throat microphones.
- Voice-Activated (VOX) or Push-To-Talk systems.
- Adapter Cords for over 300 Two-Way Radio models.

For more information and a **FREE demonstration**, call toll-free: **1-800-900-3434**



**David Clark** COMPANY  
INCORPORATED

360 Franklin Street, Box 15054, Worcester, MA 01615-0054 U.S.A.  
TEL: (508)751-5800 E-Mail: sales@davidclark.com FAX: (508)753-5827

©1997 David Clark Company Inc.



T-4



quency coordination for 700 MHz and 220 MHz using a channel plan that Crosby said is flexible, depending on market location.

"We can accommodate either data or voice, and we need to be careful; we need to know where the transmitters are located and whether customers are using digital or analog equipment," Crosby said.

For system design, Crosby said customers normally rely on their equipment

manufacturer's engineering resources or on engineering firms with which they have had long-standing relationships.

Crosby identified the USMSS membership as a source for system design services.

"We have a close relationship with the USMSS community. They're helping us with field measurements and verification. And there are other sources to secure qualified engineering support. System design is

not our business. It's a major piece of what will make 700 MHz a great solution, but it's simply not our core competency," he said.

Regarding mobile voice communications subscriber and infrastructure equipment, Crosby said that such products are available today from Motorola at both 220 MHz and 700 MHz, and that in the 220 MHz band, there are other suppliers, such as Tait. He said that Microwave Data Systems produces fixed data products for both bands.

As for wideband mobile data, Crosby noted that Motorola's Greenhouse Project used 150 kHz-wide channel pairs in a Pinellas, Fla., test project. "This technology can be accommodated in our 700 MHz band, but I understand that it's still a few years away.

How does Access Spectrum set its prices?

"The price is not only dictated by the geographic size of the system, but by spectrum capacity, spectrum availability and system location. To remove any confusion, our spectrum fees are not charge on a per-unit basis," he said.

Crosby said that the belief that Access Spectrum's 220 MHz and 700 MHz spectrum wouldn't be affordable is simply "an excuse not to engage with us."

He placed the opportunity for airborne systems between Nextel and 450 MHz shared systems.

"Nextel is an ideal communications solution for many consumers, particularly those with mobile fleets of 10-15 units. But there also are customers with fleets in excess of 15 units where a traditional SMR or a private system may be the optimal solution - especially for users with more than 70 units.

"A traditional private carrier system should be able to generate \$20 to \$30 or more per unit per month depending on the area and the competitive environment, using Access Spectrum's exclusive spectrum capabilities. If a customer believes that they can only charge \$12 per unit per month, it's probably preferable that they accommodate that market demand through the use of a 450 MHz system.

"On our spectrum, with the exclusivity it offers, our customers are in a position to provide real value to that unserved marketplace," Crosby said.

It remains to be seen if Crosby this evangelist's gamble payoff. ■

## 500,000 MDS Radios Installed in 110 Countries



**Wireless Ethernet  
Wireless Video & Security  
Wireless Voice-Over-IP  
Portable/Mobile Solutions  
Wireless Data Acquisition**

### MDS Industrial Wireless Networks... Lowest cost of ownership

- Longest range solutions and industrial specs.
- MDS NETview MS™ SNMP-based Network Management Software.
- Secure enterprise-wide access to information anywhere by PDA, cell phone or computer.

MDS offers global wireless solutions at frequencies from 150 MHz to 2.4 GHz with speeds from 300 bps to 8 Mbps

industrial/wireless/performance



Microwave Data Systems Inc. • 175 Science Parkway, Rochester, NY 14620 USA  
www.microwavedata.com • 585-242-9600

Circle 13 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)





# King of the hill. The valley. And everywhere in between.

Field-proven and ready for anything, the General Dynamics R2670 Communications System Analyzer (and its sister product, the R2625, for when legacy support isn't required) is the complete test solution you're looking for. It supports everything from conventional analog to APCO Project 25 Digital Trunking.

This should come as no surprise, since we've been providing Analog Trunking solutions since 1984 – and we're the folks who developed P25. In addition, the R2670 supports:

- Both VSELP and IMBE compatible vocoders
- SMARTNET/SmartZone™ (Type I, Type I EP II, Type II)
- SECURENET™ Secure Voice
- Multiple encryption formats: AES, DES, DES-XL, DES-OFB, DVI-XL and DVP-XL
- Programmable with compatible KVL – no need to only utilize the built-in test keys
- ASTRO™ trunking with both VSELP and IMBE vocoders

- Project 25 digital trunking with support for Linear Simulcast Modulation (LSM) – flash upgrade to system release 6.1 coming soon

The R2670 also stands up to heavy field use with a proven 33,000 hour MTBF, and a choice of AC, DC, or battery operation.

Best of all, while other companies are *talking* about delivering an effective Communication Systems Analyzer of their own, the R2670 is available now! Even better, our complete Project 25 test solution can be yours for thousands less than you'd think.

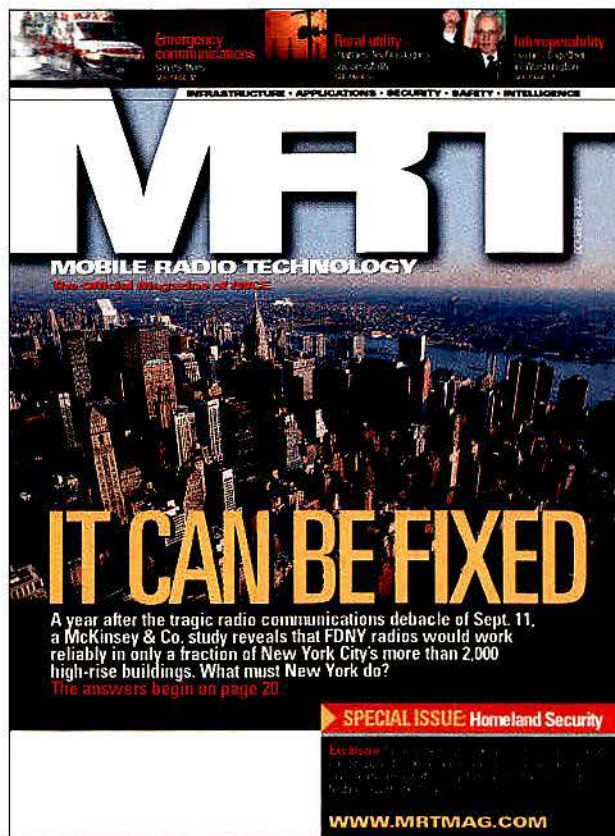
But what else would you expect from the industry leader in APCO test solutions?

Visit the General Dynamics Website at [www.gd-decisionsystems.com/cte](http://www.gd-decisionsystems.com/cte); email us at [customer.service@gd-decisionsystems.com](mailto:customer.service@gd-decisionsystems.com); call toll free 1-877-449-0600 or 1-480-726-1048.

We'll impress you. Royally.

**GENERAL DYNAMICS**  
Decision Systems





**Practical. Technical. Powerful.**

MRT... your online resource.

In-Depth Articles • Case Studies • Manage Your Subscription  
Free Product Info • Research and Tools • Buyers Guide  
Register for IWCE 2003 • March 12-14, Las Vegas

**[www.iwce-mrt.com](http://www.iwce-mrt.com)**



continued from page 20

Notter explained that even dealers who do not sell Motorola radios could build an airtime systems and find opportunity because the Motorola distribution channel could sell units for use on those systems, stimulating activity.

To begin with, Motorola wants to sell into the top markets and find a way to deploy "at least some level" of shared systems, Notter said, "We're looking for a plan to make that happen, at least in the top 10 markets."

Motorola has been testing a 220 MHz system with two sites and PassPort trunking in Chicago, and a counterpart 700 MHz system with LTR trunking in Las Vegas, which Notter described as a strong radio market.

"The testing has been very favorable. The audio quality has been good," Notter said.

Although Access Spectrum is the most active band manager and is the only one with a discernable marketing plan, Notter said that Motorola has heard from other band managers that have expressed some interest in the Motorola product.

Notter said that the biggest challenge with the 220 MHz band is that it is small and limited, yet it offers opportunity when its 5kHz channels can be aggregated - a factor he said was critical.

Motorola's new 220 MHz product is the first FM radio the company developed for the band, but Notter said that if only the 220-222 MHz segment were involved, it might not have been enough of an opportunity.

"We wanted to concentrate on the first five megahertz [216-222 MHz] first, but the product is type-accepted for 216-225 MHz, so there's an opportunity. Plus it fits global markets that operate on different frequencies," Notter said.

Motorola has been working with 220 MHz license holders to identify markets, and Notter said that many utilities have licenses and no real opportunity to deploy systems.

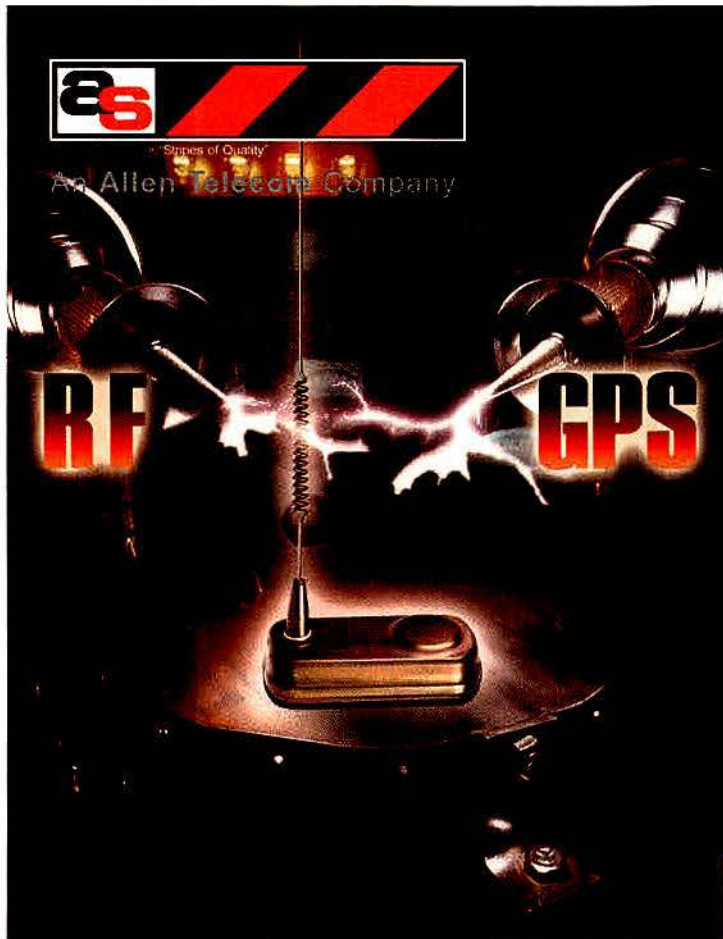
"Even if they can only put out 12.5 kHz channels, that may be all they need. A quality FM radio that works is of interest to them. We did an analysis with that vertical market. We conducted workshops with them," Notter said.

Motorola has documentation and has worked with consultants enough to know that the market exists for shared private carrier systems in key markets. But Notter said private carriers need an affordable product that's more than dispatch-although dispatch would be predominant.

"We have a mission for a data product in conjunction with the two-way radio. We know AVL and status messaging would add value. We have plans for those. We also want to take advantage of other product portfolios for SCADA," he said.

"The Professional Series product we picked is the easiest and most cost-effective, and has a wonderful portfolio of accessories and consoles. New products usually take years to get to that level, but we can leverage off that platform," Notter said.

Although Notter said Motorola wouldn't limit a customer's vision as to how many sites to network, he said that he didn't expect many markets would use a huge number of sites because of the return-on-investment model. He said that where a dealer could offer extended local, seamless coverage, there's a market for it. ■



**es** Stripes of Quality  
An Allen Telecom Company

**RF** **GPS**

## FORMULA FOR GPS SUCCESS

Take one **Antenna Specialists** brand antenna. Add GPS capability. Result - **Tele-Locator™** dual system antennas! Whether using trunking, cellular, PCS or traditional LMR for voice communications, active GPS antenna capability may be added for location and asset tracking needs. Mounting configurations range from low profile Medallion™ to Mosaic® trunk lid mounts.

For the latest in Tele-Locator solutions, visit our website.

**antenna specialists**  
**www.antenna.com**

**800-321-9977**



# Guard band breakdown

## What are their game plans?

While Access Spectrum says it has one customer and a strategy for sales, other companies with guard band licenses are less forthcoming.

### Customer prospects

Pegasus disclosed for the first time that it is in "active discussions with a number of potential users for its guard band licenses." Although it does not have any agreements in place, Pegasus told the FCC that it is in the process of negotiating spectrum lease agreements for its licensed areas. Pegasus said that it hopes to begin entering into lease agreements with spectrum users within a year.

None of the other band managers had anything to say about customers, although Nextel said that it had made its spectrum available for the use of wireless microphones at the Olympic and Paralympic Games in Salt Lake City last winter.

### Trading up

Nextel has no plans to put its guard band spectrum to use if it can trade it for much more valuable 1.9 GHz spectrum that it could use for third-generation cellular service.

And why shouldn't Nextel wait and see what happens in the pending FCC proceeding to resolve interference to public safety radio communications systems in the 800 MHz band if the outcome means a breathtaking spectrum upgrade? As do all the band managers, Nextel has until Jan. 1, 2015, to develop its 700 MHz spectrum.

"In the event the FCC does not adopt an 800 MHz band plan to address public safety interference that includes a spectrum swap involving the 700 MHz guard band spectrum held by Nextel, Nextel intends to meet its substantial service requirements on the guard band by the 2015 license renewal date," Nextel told the FCC.

### The equipment question

Some band managers told the FCC that they knew equipment for 700 MHz was available, and others seemed to be oblivious.

### The Big Three

Access Spectrum — 21 licenses

Pegasus — 34 licenses

Nextel 700 Guard Band, Reston, Va. — 39 licenses

### The rest of the pack

Radiofone Nationwide PCS, Metairie, La., has one license for the Gulf of Mexico

PTPMS II Communications, Cranford, N.J., has three licenses

Dominion 700, Alexandria, Va., has one license for Washington, D.C.

Harbor Wireless has one license for Alaska

Motorola has one license for New Orleans-Baton Rouge

Access reported that it had met with "[more than] a dozen manufacturers of voice and data radio equipment—including Microwave Data Systems and Trident Micro Systems, that have begun to develop 700 MHz equipment—to facilitate the development of equipment that utilizes our 700 MHz spectrum."

Access also told the FCC that it had "entered into an agreement with Motorola to design, manufacture and market infrastructure and portable and mobile radio products for use by enterprises and private carriers."

"Equipment currently available for use with the 700 MHz guard band licenses includes a trunked subscriber portable and mobile radio system from Motorola; repeaters from Spectrum Corp., and PassPort trunking controllers from Trident Micro Systems. In addition, Microwave Data Systems has announced the future production of a system for private point-to-multipoint operations, and SCADA has announced a remote telemetry unit and master station unit," Pegasus wrote.

"Delays in the auction of adjacent 700 MHz licenses have caused delays and uncertainties over the availability of equipment for the 700 MHz band," Harbor Wireless told the FCC.

"Radiofone is not aware of any available base station or end-user equipment that is commercially available at this time," Radiofone reported.

"Due to uncertainties related to the adjacent 700 MHz spectrum bands and the lack of available equipment for commercial use at this time, PTPMS II is unable to predict when it will have agreements in place for the use of the spectrum, or when equipment will become available," PTPMS II wrote.

"Motorola has received FCC equipment authorizations for base, portable and mobile equipment capable of operating in the 700 MHz guard bands. The equipment is available for shipment today or in the near future," Motorola told the FCC.

"Largely due to the broadcast incumbency on these frequencies, there is little, if any, readily available equipment that can operate at the guard band frequencies other than for public safety radio systems," Nextel reported.

Dominion, whose report contained the fewest details, told the FCC nothing about equipment availability.

Siegel is a partner with Columbia Capital, Alexandria, Va., an original investor in Nextel Communications, and an investor in Neoworld, Bloomfield, N.J. Neoworld, headed by a former Nextel president, bought 900 MHz spectrum from Geotek after that company went bankrupt, and Neoworld apparently never developed it. Neoworld then sold its spectrum to Nextel this year, and that 900 MHz spectrum might be included in Nextel's spectrum swap. ■



# We've got you covered!

## A complete line of Project 25 VHF radios for every situation

**G25RPV100**  
Portable Unit  
1-5 watts

**G25RBV100**  
Base Station  
50 watts

**G25RMV100**  
Mobile Unit  
50 watts

**High performance digital radios for government, public safety and business.**

- A complete line of Project 25 compatible VHF products
- Portable, mobile and desktop models
- A wide range of options and accessories
- P25 analog, digital, wide and narrowband operation
- 136-174 MHz
- 256 Channels, 16 zones, 4 channel banks, shadow channels
- Software defined keys - user programmable
- Backlit display
- DES, OFB-DES Encryption
- OTAR
- PC-based Windows programming software
- Cloning

**G25RMV110**  
Remote/Trunk Mount Unit  
110 watts



**GUARDIAN™**  
BY DATRON  
THE VITAL CONNECTION

 **TITAN SYSTEMS CORPORATION**  
DATRON WORLD COMMUNICATIONS DIVISION

Contact us today: 760.597.1500 • [www.dtwc.com](http://www.dtwc.com)  
3030 Enterprise Ct. Vista, CA 92083

Circle 15 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)



# Executive decision

## Uncle Sam offers Colorado shot at interoperability

**T**he White House Office of National Drug Control Policy, through its Counterdrug Technology Assessment Center's Technology Transfer Program, has funded and engineered Colorado's

Wireless Communications Interoperability System. The system enables agency-to-agency radio communications for a wide range of daily law enforcement and individual emergency applications.

Although the federal government paid for Colorado's Wireless Interoperability Communications System so it would be available to support federal, state and local interagency drug interdiction and surveillance operations, the system also is intended to facilitate radio communications interoperability for all public safety operations.

On April 20, 1999, police officers at

Columbine High School in Jefferson County, Colo., could not communicate by radio with many of the other officers, firefighters and rescue teams sent from neighboring cities and counties to respond to the worst school shootings in the United States.

The reason was incompatible radios, sometimes on different frequencies and sometimes using different technical protocols. For example, Lakewood law enforcement officers couldn't talk to responding Denver or Sheridan law enforcement officers. The mismatched communications made it difficult for officers to coordinate their efforts and to know who was exactly where.

U.S. Sen. Ben Nighthorse Campbell (R-Colo.) had vowed to do what he could to reduce the risk of similar communications problems during emergencies of that scale. When he learned that the Office of National Drug Control Policy was experi-



**Drug czar John Walters, head of the White House Office of National Drug Control Policy.**

menting with high-tech systems to solve the problem of incompatible radios, he secured federal funds to make Colorado a wireless interoperability development site for the White House program.

On Aug. 20, 2001, the Denver Metro section of the new statewide system went into operation, connecting U.S. Customs Service officers with local police for hundreds of surveillance and arrest operations.

## CTAC funds counterdrug efforts

Since 1990, the White House Office of National Drug Control Policy's Counterdrug Technology Assessment Center has been overseeing and coordinating the counterdrug research and development programs of all federal drug control agencies.

It sponsors a counterdrug technology research and development program to advance the technological capabilities of federal drug control agencies and a Technology Transfer Program to enhance the capabilities of state and local law enforcement agencies for counterdrug missions.

The counterdrug research and development program addresses the scientific and technological needs of the federal drug control agencies.

It has included demand reduction projects in brain imaging technology, therapeutic medications, assessment of treatment programs, supply reduction projects for cargo inspection, for drug smuggling, drug crime information handling, communications, and surveillance.

The counterdrug research and development program also includes operational test and evaluation activities to evaluate off-the-shelf and emerging technology prototypes for use in the field.

During the past three years, Congress has appropriated \$39 million, empowering CTAC to provide federally developed advanced devices and systems to about 4,000 of America's 18,500 state and local law enforcement agencies.

These technologies allow cops to communicate across agency lines in real time despite incompatible radios, see through darkness, detect money laundering, penetrate complex drug trafficking conspiracies with digital wiretaps, track drug dealers via satellite, share drug crime information among regional departments, and convert shaky, apparently useless surveillance video into clear, court-presentable evidence.

Many arrests, indictments, and convictions have been credited to the technologies, and officer safety has improved as a result of the deployment of the Technology Transfer Program.

—Source: The White House



# They Need Working Radios. They Deserve...



**iQ<sup>ten</sup>**



**iQ<sup>five</sup>**



**iQ<sup>pac</sup>**



**itech**

**...iTECH's iQ series - products that extend battery life, reduce battery costs and improve battery performance.**

**iQ<sup>ten</sup> - high-performance, time-saving battery tester**

- ♦ Battery test and maintenance; bar code programmable
- ♦ LCD displays battery capacity and test data
- ♦ Computer interface tracks battery performance
- ♦ NiCd/NiMH/Li-ion/Sealed Lead
- ♦ Costs 30% less than nearest competitor!

**iQ<sup>five</sup> - the mobile industry standard**

- ♦ One touch battery test and maintenance
- ♦ NiCd/NiMH/Li-ion
- ♦ Affordable price, amazing value!

**iQ<sup>pac</sup> - personal analyzer charger/conditioner**

- ♦ Analyzer/Conditioner with two-step programming
- ♦ Lock programs to prevent tampering
- ♦ NiCd/NiMH and Li-ion
- ♦ Saves you time (money) – field users can easily maintain their personal batteries
- ♦ A price that can put battery maintenance in the field!

**30-day satisfaction guarantee**

**Three-year warranty**

**Made in the U.S.A.**

**Call 800-233-6868 or visit [www.itecheng.com](http://www.itecheng.com) today!**



One year later, John Walters, the special assistant to President Bush who heads the Office of National Drug Control Policy (Walters is commonly referred to as the nation's "drug czar"), accompanied by Campbell, traveled to suburban Douglas County near Denver to announce the national roll-out of the Wireless Communications Interoperability System.

Walters described it as an effective, low-cost, high-tech fix to local and national law enforcement agencies with radio incompatibility and an important improvement to homeland defense capabilities.

"Drug and other law enforcement operations can be seriously compromised by the prevailing reality that in most areas of America today, local police cannot communicate by radio with state police, the FBI, DEA, Customs and the National Guard," Walters said.

At the event, Campbell introduced a

video that explained the operation of the system and included testimonials by federal and local law enforcement officers who had made almost daily use of the system.

Sheriff's Lt. Jim Smith, commander of the Boulder County Drug Task Force, said that previously, the only way officers from multiple agencies could communicate with one another by radio was for them to carry one portable radio from each of the other agencies participating in the operations. The video showed Smith in the field, trying to juggle portable radios to communicate across agency lines.

"As you can see," said Smith's voice on the video, "this is cumbersome during planned operations, and impossible in unplanned emergency situations. The new system makes easy what had been impossible."

Walters said: "The Counterdrug Technology Assessment Center, under the leadership of Chief Scientist Dr. Al

Brandenstein, has been authorizing research and development engineering on this problem for the past seven years. The result is a custom-engineered-and-installed Wireless Communications Interoperability System, which we are now offering to local and state law enforcement agencies. It takes the full range of dissimilar, independent and incompatible police radios—UHF, analog VHF, digital 800 MHz, digital 700 MHz—and makes simultaneous communication easy."

The system uses a digital switch connected to radio transceivers from each participating agency. It captures incoming radio messages, converts them to audio and makes them available to as many as seven talk groups, established via the dispatcher's computer at a host department. In the Denver metro area, the Lakewood Police Department hosts the system.

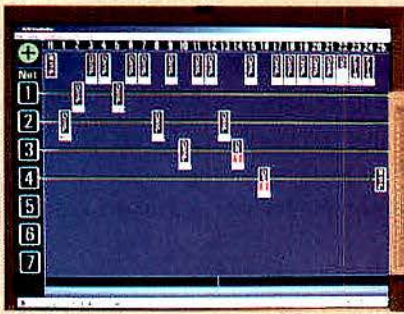
Since its implementation in Colorado

## Lakewood hosts Metro Denver WICS

Steven Kabelis, a senior systems analyst with the Lakewood (Colo.) Police Department, said that a JPS Communications ACU-1000 computer-controlled cross-connect is at the heart of the Wireless Communications Interoperability System installed there.

The installation includes an equipment rack with radios from every agency that wants to interconnect and a computer that controls the interconnection. The police department's communications center can select which radios need to talk with another and set up the links upon request.

Outside, directional antennas point to the other agencies' repeater sites to pick up their signals. Omnidirectional antennas pick up signals from aircraft.



The control screen at Lakewood's 9-1-1 dispatch center allows interoperable radio networks to be created 'on the fly' when needed.

"Anyone with access can dial in with a cell phone and become part of the communications network. For example, someone in Washington could dial in and participate and communicate with anyone on those talk groups," Kabelis said, referring to the federal need to communicate with local and state agencies during surveillance operations that might extend over great distances.

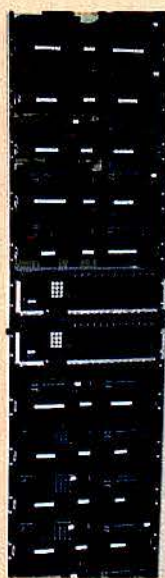
"When agents get in back of someone in New York, they may follow them to California. You don't know where they're going," Kabelis said.

"We have drug task forces, and they communicate with U.S. Customs Service aircraft or with the National Guard if they're training. We have air talking to ground talking to supervisory, and they might be from different agencies, such as Denver, Lakewood, Jefferson County, Customs aircraft—whomever, they connect and communicate. The system was geared toward drug interdiction and surveillance," Kabelis said.

Kabelis noted that anyone who is part of the system could call in, properly identify, and the Lakewood dispatch center would set up the necessary patches.

"We use it more and more for local purposes as time goes on," he said.

Colorado is in the process of deploying a statewide 800 MHz system, but Kabelis said that the need for the Wireless



The 'brains' of the Wireless Communications Interoperability System installed at the Lakewood Police Department: the ACU-1000 with attached radios.

Communications Interoperability System would continue even after the statewide network is activated.

He explained that many volunteer fire departments have VHF radios and no money to replace them with 800 MHz units. Also, several

larger cities, including Denver, Lakewood and Aurora, are using 800 MHz M/A-Com EDACS trunked systems that are not compatible with the statewide Motorola system.

"In fact, the ACU-1000 serves a need to tie the diverse 800 MHz systems together. We will still need the ACU-1000," Kabelis said.

—Don Bishop



a year ago, the system has enabled local, state and federal law enforcement agencies to communicate simultaneously, facilitating drug busts and seizures of narcotics and guns.

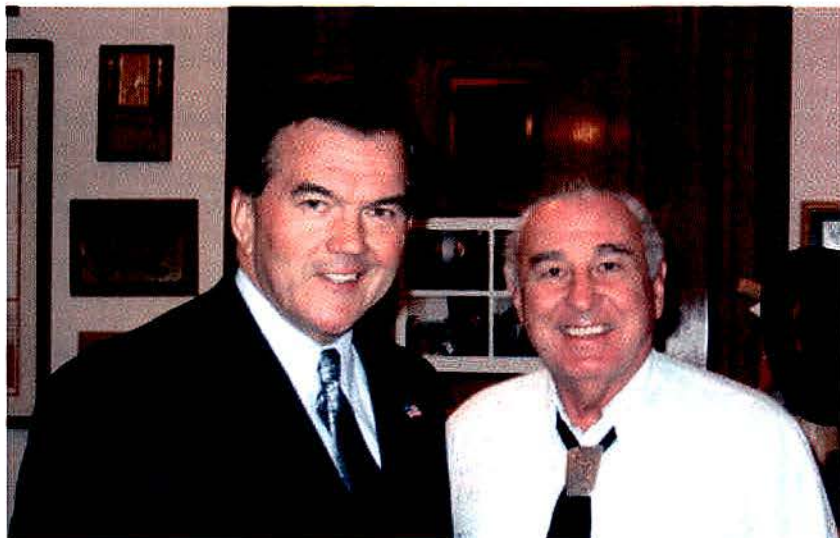
Three days after the terrorist attack on the New York World Trade Center and the Pentagon, a credible bomb threat was made against the Denver Federal Center in Lakewood. The Wireless

Communications Interoperability System, linked by the Lakewood Police Department, allowed responding fire units, federal agents and local police to coordinate and determine the correct response to the bomb threat.

Similarly, when the Hayman wildfire in Colorado's Douglas County threatened to burn homes and structures, Lakewood radio technicians made creative use of the system to help neighboring fire departments coordinate their efforts by radio and formulate firefighting and evacuation plans.

The Wireless Communications Interoperability System will be offered to law enforcement agencies across the nation through CTAC's Technology Transfer Program, which pays for equipment purchase, mandatory training, installation, first-year maintenance and follow-up.

Law enforcement agencies can apply online at [www.epgctac.com](http://www.epgctac.com). The Technology Transfer Program is administered for CTAC by the U.S. Army's Electronic Proving Ground. ■



U.S. Sen. Ben Nighthorse Campbell (right) with Tom Ridge, head of the White House Office of Homeland Security.

Map Place Site Delete Site Reset Sites Poll All Activate Legend Exit

# Federal Commander Digital System



*Engineered to meet the precise requirements of public safety, Federal Commander Digital System provides a high quality, wireless two-way status monitoring system for use in outdoor warning and other critical applications.*



**FEDERAL SIGNAL**

Federal Warning Systems

2645 Federal Signal Drive

University Park, IL 60466

Sales: 800/548-7229

[www.federalwarningsystems.com](http://www.federalwarningsystems.com)



### Extending the power of wireless

#### **Centurion Wireless Technologies Inc.**

is a leading global designer and manufacturer of antennas and power products for wireless applications. Centurion's customers include the largest wireless OEMs in the cellular handset and wireless data markets.

Centurion was founded in 1978 by Gary and Susan Kuck, who saw the need for a durable and superior-performing portable antenna. They established an "in-house" approach to the introduction of sales and production of the new antenna: sales during the morning, design in the afternoon and production in the evening. Twenty-three years later, Centurion has grown from two to more than 1,200 employees around the world at seven different locations. Centurion has continued to maintain a competitive edge in the wireless market through significant investment in research and development, corporate quality planning and technology that anticipates the requirements of future market demands.



#### **Application**

As a leading OEM supplier, Centurion provides custom-designed products for a broad range of applications including cellular handsets, data collection devices, two-way radios, wireless local area networks (IEEE 802.11a and 802.11b), wireless local loop, in-building wireless, telemetry, telematics, Bluetooth, PCS, GSM, GPRS, 3G and GPS. The experience that comes with this vast array of applications enables Centurion to design, develop and manufacture a multitude of custom products for its clients.

#### **Capabilities**

Centurion applies the latest technology to many aspects of production. These technological advances reduce cycle time, increase consistency, and improve quality during the production. More than 90% of Centurion's automation and tooling is designed and produced in-house to provide full turnkey capabilities.

#### **Global facilities**

Centurion's corporate office is in Lincoln, Neb. With additional sales and R&D offices in Shanghai, P.R.C.; Aylesbury, U.K.; Seoul, S. Korea; Penang, Malaysia; Westminster, Colo., and Scotts Valley, Calif., along with sales representatives and distributors around the world, Centurion is easily accessible to its clients. This global footprint enables Centurion to have engineering, sales and manufacturing resources close to its customers in order to quickly meet their high-volume needs, while saving customers time and money in production and development costs.

#### **Quality**

As an ISO 9001 registered company, Centurion has quality assurance programs in place at all phases of design and development. The Lincoln, Nebraska, and Shanghai facilities are ISO 9001 registered and the manufacturing facilities in Penang, Malaysia, and the United Kingdom are both ISO 9002 registered.

### Custom antenna and power products solutions

Wireless equipment manufacturers choose Centurion for their custom antenna and power products because of its advanced technology, broad product line, manufacturing capacity, product design capability, international presence and ability to respond quickly to orders. Centurion's significant vertical integration in process technologies enables it to design and develop new products cost effectively, and reduce its customers' reliance on multiple component suppliers while ensuring the highest quality standards.

Centurion's custom design teams (located at five design centers around the globe) provide integrated research, design, tooling, molding, assembly and complete accelerated life testing capabilities to their clients when designing custom components.

Their effectiveness is enhanced and completed with Centurion's global manufacturing capabilities. Centurion is able to shift manufacturing capacity to the appropriate site in order to service and rapidly respond to customer needs while maintaining a high level of engineering and design control over the end product.

#### **Antenna technology**

Centurion uses innovative technology to remain the industry leader in antenna design and development. Centurion communicates with its clients on a continual basis to understand their products and how they are going to be used. Centurion's highly skilled and experienced development teams are then able to design a component that will meet and exceed the client's needs.

Centurion designs, develops and manufactures antennas for wireless handsets, wireless data devices and two way radios. Their products are used daily by cellular phone users, emergency services, public works, airports, automotive race circuits, and rental car fleets. They cover applications from 27 MHz to 6 GHz. Each Centurion antenna is individually tuned to frequency, maximum gain, and radiation pattern performance. Centurion has developed patented technology for the operation of its collapsible and retractable antennas, and also offers several stubby antennas for cellular handset use. Centurion has injection-molded antennas in articulated, fixed, retractable or internal configurations that perform in a full range of frequencies, bandwidths, patterns and gain.

#### **Power product technology**

Centurion offers power source integration for mobile phones, pagers, portable two-way radios, telemetry and tracking, automated warehousing, inventory control and laser survey transits. Molded in their in-house plastics division, every battery pack is tested to make sure it meets or exceeds all electrical, mechanical and functional specifications. Design elements allow for custom assemblies of lithium polymer, lithium ion, nickel metal hydride, nickel cadmium and alkaline cells. Centurion can create custom case molding for unique aesthetic designs and has developed proprietary cell charging and analysis techniques. Centurion's strong relationships with industry-leading battery cell manufacturers, and its ability to custom design power solutions, give Centurion the opportunity to provide its customers with a total power solution.

#### **Looking Ahead**

Centurion's research and development division is developing new internal solutions for the handset, PDA, Bluetooth applications and more. To assist in this quest, Centurion has expanded its R&D to include the West Coast Design Center (WCDC) in Scotts Valley. WCDC uses the latest design and modeling tools to support its West Coast customers' design concepts.

Regardless of your antenna or power source needs, Centurion continues to raise the bar for end-product performance. With cutting edge technology, intellectual property, global manufacturing capabilities, state-of-the-art R&D and testing facilities, Centurion helps companies thrive in the rapidly changing world of wireless communication.

**Centurion Wireless Technologies, Inc. • [www.centurion.com](http://www.centurion.com)**





## Maximum Power For Maximum Performance



NiCd and NiMH



### Centurion Batteries

Unleash the power of Centurion OEM and aftermarket batteries in integrations for mobile phones, pagers, portable two-way radios, telemetry and tracking, automated warehousing, inventory control and laser survey transits. Built from the highest quality cells and molded in our state of the art facilities, each Centurion battery is produced to deliver maximum performance and tested to ensure it meets or exceeds all industry specifications.

Centurion aftermarket batteries are engineered to offer the same product performance as the original power source. Our batteries never compromise performance quality and are guaranteed to deliver equal or greater power than the original part.

Centurion batteries are available from your preferred distributors: Tessco, Talley Communications, Hutton Communications, Electro-Comm, Electro-Comm West, AF CommSupply, Primus Electronics and Pulstar Distributing.

Visit [www.centurion.com](http://www.centurion.com) for our entire line of antennas and batteries



# Discover the power.

2003

**iwce**

The Wireless Marketplace

INFRASTRUCTURE • APPLICATIONS • SECURITY • SAFETY • INTELLIGENCE

➤ BASE STATION WORKSHOPS: MARCH 10-11, 2003 ➤ CONFERENCE AND EXHIBITS: MARCH 12-14, 2003  
➤ LAS VEGAS CONVENTION CENTER, LAS VEGAS

## CONFERENCE PROGRAM

### Keynote Speaker:

Ambassador Richard Butler, former arms inspector to Iraq

### ➤ HOMELAND SECURITY

#### Homeland Security—Where the Money Is, and How to Get It

The president's budget request would provide \$3.5 billion per year for the next four years to "first responders" in their homeland security work. Much of the money will be distributed through grants from Federal departments such as the Federal Emergency Management Agency. Public safety agencies need to know how to apply for grants, and vendors need to know who gets the money to target sales efforts.

#### Homeland Security Budget Blues: Don't Go Overboard

Billions and billions of dollars sounds good, but just how far does it go? The president's budget proposes \$3.5 billion for first responders, annually, for four years. Maybe \$1 billion, or maybe much less, will go to communications systems. When you slice the money thin, various agencies may receive amounts ranging from thousands to a few millions of dollars, not enough in most cases for entirely new communications systems. Reality check: Use just the right incremental improvements to substantially increase communications capability.

#### Homeland Security—Outlook and Forecast

Consulting companies and trade associations have been in the business of tracking federal spending and looking to direct it toward their clients and members since long before homeland security became an issue. First, a look at where the first responders money is coming from. Second, a view from an organization that wants most of it to be directed to local agencies.

#### Homeland Security—What Congress Wants to Provide You

The big picture on Homeland Security starts at the top. By the time of IWCE 2003, there may be a cabinet-level Department of Homeland Security. Already in existence is an Office of Homeland Security in the White House. And in Congress, it's the Select Committee on Homeland Security in the House of Representatives. Hear from senior staff about priorities and funding for Homeland Security initiatives.

#### Homeland Security—Washington, DC communications

Public concern for safety in the nation's capital led to the CapWIN Project to improve coordination and information sharing among public safety and transportation agencies



# DON'T MISS THIS OPPORTUNITY!

and organizations in Maryland, Virginia and the District of Columbia. The project has national implications in technology transfer including image/video transmission and the inclusion of transportation applications in an integrated system.

## ➤ TRANSPORTATION AND UTILITIES APPLICATIONS

### Air and Motor Transport Communications Alternatives

Some companies still see value in two-way radio communications systems, while others have moved away to other alternatives. Here's what's behind the choices for some of the nation's largest carriers.

### Public Safety/Utility Partnerships offer cost savings and coverage advantages

Utility companies and public safety agencies have similar requirements for radio communications, which have led to partnerships in which they share a common radio system. Advances in network-based infrastructure make sharing easier than ever.

### Economics of Digital Technology

Wide-area radio networks sometimes use analog, sometimes digital, and sometimes variations. What's behind the choices can involve proprietary protocols, population density, kinds of customers or business served.



### Utilities as SMRs

One of the more spectacular collapses of a radio communications strategy for utility companies can be found in the ruins of the Securicor Wireless and National Rural Telecommunications Cooperative alliance that sought electric utilities to become SMRs on 220 MHz. Some multimillion dollar systems were built, only to be abandoned. But changes are coming, and utilities may yet find opportunity in this small VHF band.

## ➤ INTEROPERABILITY

### Wireless Public SAFETY Interoperable COMMUNICATIONS Program—Project SAFECOM

Project SAFECOM wants to help federal, state and local agencies boost wireless communications interoperability. As the managing partner of SAFECOM, the U.S. Department of Treasury and its federal partners are responsible for achieving interoperability across public safety entities. Here's where help from the government begins.

### Where Interoperability Starts

Communications is only part of the interoperability equation. Inter-agency cooperation holds the key to true interoperability. Top city officials, such as mayors and city managers, have the ability to draw the police, fire and emergency medical service providers together to plan their operational interoperability.

### Interoperability on Wheels

Public safety agencies without network-based or console-based radio interoperability can use mobile command centers fitted with cross-connect switches and multiple radio technologies to link responders' radio communications together on-site.

### Lessons Learned From 9/11

Current officials won't talk much about it, in part because of pending litigation, but a long-standing lack of incident command coordination and communication between the New York Police Department and the Fire Department of New York contributed to a possibly avoidable loss of life in the collapse of the New York World Trade Center. New York Times reporters found that most radio systems worked well, with the possible exception of the fire department's radio system, and that both operational and radio communications deficiencies had been identified but left unresolved since the 1993 terrorist bombing of the World Trade Center.



# 2003 iwce

The Wireless Marketplace

INFRASTRUCTURE • APPLICATIONS • SECURITY • SAFETY • INTELLIGENCE

➤ BASE STATION WORKSHOPS: MARCH 10-11, 2003 ➤ CONFERENCE AND EXHIBITS: MARCH 12-14, 2003  
➤ LAS VEGAS CONVENTION CENTER, LAS VEGAS

## More Lessons Learned From 9/11—The Pentagon

A separate, but related, disaster faced public safety agencies in Arlington, VA, where a hijacked jetliner crashed into the Pentagon on Sept. 11, 2001. Although radio communications interoperability worked well during the first five or six hours of the response, as responders from greater distances arrived, problems arose.

## ➤ REGULATORY/POLICY

10:00am-10:50am

### Wireless E9-1-1 Update—What's It Going to Take?

Where some wireless carriers are dragging their feet or blaming their vendors for delays, others have stepped up to the plate to deliver enhanced 9-1-1 services the way the FCC and public safety agencies expect.

### Musical Chairs—Got a frequency? Change it! Dance the 800 MHz shuffle!

As this is written, no one knows exactly what decision the FCC will make in an effort to resolve the interference from Nextel and cellular carrier signals to public safety and other radio communications systems in the 800 MHz band. Whatever the decision turns out to be, this session will explain the ramifications. Bring your lunch if you'd like to continue the discussion into the lunch hour.

### Now, Exactly When Is it We Get The 700 MHz Band?

The 700 MHz band is heavily encumbered, meaning that TV stations still occupy channels that would have to be vacated if the frequencies are to be converted for use by public safety agencies. A combination of government policy about broadcasting and FCC regulation of radio communications affects the availability.

What Canadian government policy and regulation means for Canadian airtime service providers, public safety agencies and homeland security.

Canadian operators who attend IWCE face problems that are similar to those of their American counterparts, yet the specifics vary because of different spectrum allocations, regulatory initiatives and government policy. Public safety communications are organized somewhat differently, and coordinating homeland security with the United States has implications for Canada.



How federal policy and FCC regulation have shaped technology, product development, and purchasing by federal and public safety agencies.

Two federal government regulatory mandates are shaping the marketplace: Project 25 and narrowbanding. With P25 mandated for the 700 MHz band and narrowbanding mandated for all federal users, options for end-users become clear, if not limited.

## ➤ PUBLIC SAFETY

### Digital Technology—Is It Worth the Cost?

The dollar figures sometimes can be staggering; in the hundreds of millions for modern digital radio communications systems. Digital radio serves government entities big and small, yet some make the decision to go digital, and others remain analog and even upgrade their analog systems. Consultants and officials connected with agencies making choices explain the economic realities.

### Fighting Fire With Radio—The 2002 Wildland Fire Season

Last year's wildland fire season was one of the worst on record. Radio communications plays a key role in managing firefighting efforts, from logistics to the front line. When the locals call for help, the National



Interagency Fire Center handles everything. And its responsibility for providing radio communications equipment and people to install it goes beyond firefighting.

#### **Wideband Mobile Data Choices Multiply**

Public safety agencies need high-speed mobile data for modern software applications and database access. Sending data over networks designed for voice often is too slow, as are some of the alternatives, such as CDPD. The 700 MHz band wideband data channels hold promise, but other choices are available now

#### **BUSINESS**

##### **Making Dollars With Airtime Systems**

The perennial death knell for the airtime system operator continues in the face of competition from Nextel's radio-cellphones and from the pure cellular and PCS carriers. But many dealers, from "mom-and-pop" size to some of the larger operators, find ways to compete on and off the turf occupied by wireless carriers. For some, multiple-site networking holds the key.

##### **How To Sell to Government Agencies**

Many small communications businesses miss out on good revenue by not going after the business of government agencies. Sometimes they are not aware of the opportunities. Other times, fear of "red tape" outweighs the lure of would-be profit. When you understand the processes used by government purchasing departments, you'll be prepared to respond in the most effective way.

##### **Your Future In 700 MHz Spectrum, and maybe a little 220 MHz, too.**

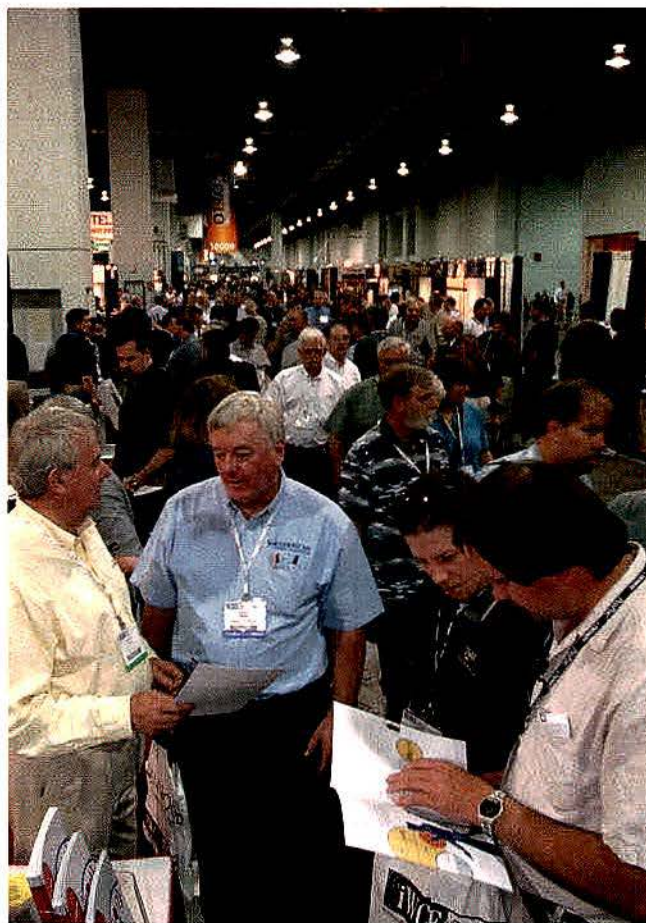
By the time of IWCE 2003, the scheduled product introduction date for 700 MHz Guard Band two-way radio equipment will have passed. It's time to get down to generating new sources of business revenue by building private and airtime service systems in this band. Only one Band Manager licensee and two vendors have announced plans to offer spectrum and products, so let's turn the floor over to Access Spectrum, Motorola and Microwave Data Systems (MDS) to learn what opportunities are at hand. Bonus: 220 MHz alternatives/opportunities.

#### **BUSINESS**

##### **The Cost of Ensuring RF Safety**

Just as with any other area of health and safety, RF radiation requires that an organization address how they deal with the issue. An RF safety program is the minimum requirement for both demonstrating and achieving compliance for any organization that has personnel, visitors or contractors that may visit or work in areas with RF field levels at or above the FCC's Maximum Permissible

Exposure limits for General Population/Uncontrolled exposures. The reasons for implementing an RF safety program should be obvious: protection of personnel, compliance with regulations and reducing liability. What is involved in developing and implementing an RF safety program? What does it cost? What else is involved? And equally important, what does it cost if we don't develop an RF safety program? These are all important questions; anyone that must deal with significant RF field levels should know the answers to these questions.



**For more information about IWCE 2003 or to register, go to [www.iwceexpo.com](http://www.iwceexpo.com) or call 1-800-288-8606.**

**For details on exhibiting, contact:  
IWCE 2003 Exhibit Sales Manager  
Renie Fuselier  
Phone: 720-489-3137  
Fax: 720-489-3101  
[rfuselier@primediabusiness.com](mailto:rfuselier@primediabusiness.com)**



# MAXIMIZE CAPACITY. PERFORMANCE. EFFICIENCY.

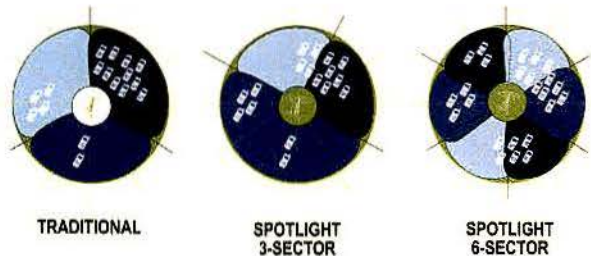
WIRELESS NETWORK SOLUTIONS FROM METAWAVE—THE SMART ANTENNA COMPANY

With deployments in some of the nation's largest wireless networks, Metawave is leading the way in smart antenna technologies that increase the efficiency of 2G and 3G networks by increasing capacity and improving performance. Using that experience, Metawave continues to innovate and find unique applications for proprietary smart antenna technologies, providing the tools needed to face some of the biggest wireless network challenges.

## SpotLight® 2200

### Increase Capacity and Performance in CDMA Networks

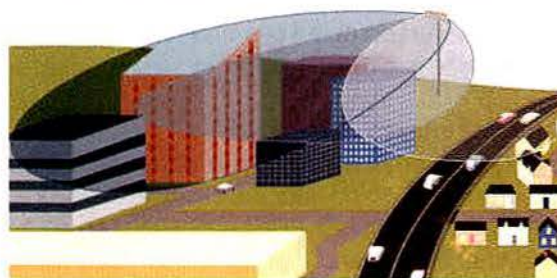
SpotLight® 2200 CDMA smart antenna systems have been proven to relieve capacity and performance issues in cell sites that experience heavy and imbalanced traffic distribution. SpotLight 2200's unique Sector Synthesis™ technology enables software-controlled customization of sector beam-width and orientation to configure sector patterns that balance cell site traffic loading. Deployments of SpotLight 2200 have produced capacity gains of up to 50% in three-sector configurations and up to 94% in six-sector configurations.



## SmartShare™

### Share Antennas, Not Antenna Patterns

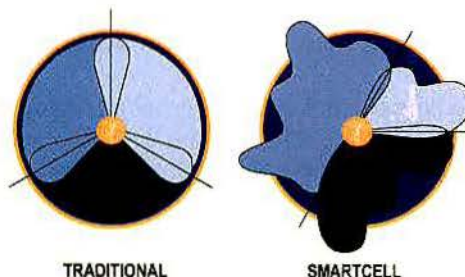
Metawave's SmartShare™ antenna sharing solution allows multiple operators to share a single set of antenna panels while independently optimizing antenna patterns for their individual networks. With SmartShare, tower owners maximize the use of height-constrained or structurally limited towers. Operators gain fast and economical access to the sites they need, and the capacity, performance and flexibility not available with standard antennas.



## SmartCell™

### Capacity and Performance in Complex RF Environments

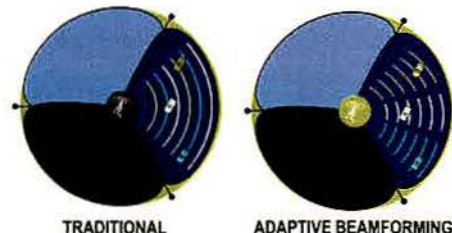
SmartCell™ is a targeted, sector-by-sector smart antenna solution for wireless networks that enables operators to "sculpt" or shape a cell site's coverage pattern in a way that delivers greater performance, capacity and coverage benefits than that of off-the-shelf sector antennas. The SmartCell system uses Metawave's proprietary Cell Sculpting™ technology to establish an optimal antenna pattern, resulting in increased capacity and improved network quality and coverage.



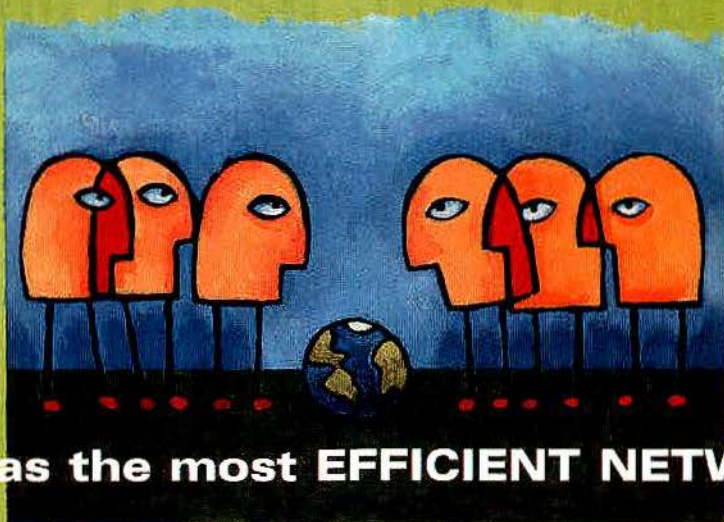
## Embedded, Adaptive Smart Antennas

### Maximize the Capacity of 3G Base Stations

Our adaptive smart antenna technology uses sophisticated processing and proprietary algorithms to calculate custom narrow beams that track each individual mobile in a sector. These narrow, individual beams significantly reduce network interference, increasing capacity by 2.5-3X and allowing more total users in the network.







**Whoever has the most EFFICIENT NETWORK wins.**

Today's economic conditions place companies in a difficult situation: either cut capital spending and risk compromising customer service or find efficiencies that help maximize their current network and remain competitive.

Whether you're faced with capacity, quality, coverage, optimization or antenna sharing issues, Metawave's proven technologies enable you to maximize your capital and network efficiency. For more information, visit [www.metawave.com](http://www.metawave.com) or call 888-METAWAVE.



CDMA GSM TDMA WCDMA CDMA2000

Circle 19 on Fast Fact Card or visit [freeproductinfo.net/mwt](http://freeproductinfo.net/mwt)



DEALERS Don Bishop

# Family Radio more than a name

## ITA insists FCC take action against businesses

**A**lthough some radio dealers sell UHF Family Radio Service two-way radios to their business customers, not all look upon the practice favorably.

A dozen or more radio manufacturers make the short-range radios that some dealers refuse to sell for business use while other dealers do.

The radios are readily available from consumer and industrial outlets and mail-order companies.

"Where we used to sell a standard business band radio to business-licensed customers in the 151 MHz band, that business has gone to FRS radios. For example, an auto dealer in Olathe, Kan., now buys FRS radios from Wal-Mart. They do fine, covering four or five acres. But that cut us out of selling business radios," said Phil Snyder, owner of M.I.N.K. Marketing, a manufacturers representative in Olathe.

Whether the FCC's FRS regulations preclude business use of FRS radios is not clear to everyone.

The Industrial Telecommunications Association would like to clear up any regulatory ambiguity and has asked the FCC to specifically ban business use of FRS radios.

"This is a battle we've been fighting for a couple of years," said Jeremy Denton, ITA's director of government affairs.

Another manufacturer's rep, Stan Reubenstein of Denver-based Aurora Marketing, said that instead of the FCC legislating a ban, it should be the responsibility of the dealer to sell the appropriate product for the appropriate application.

"I've seen people buy FRS radios in Wal-Mart, Target and K Mart, expecting





them to work. Later, they trash them or go out and try to find a better means of communication. The effect is similar to what we saw when people bought cell phones for their business and found that they needed something different. At least it brought more people into the communications marketplace," Reubenstein said.

Reubenstein said that he thinks the reasoning behind the proposed ban is that people are buying too many FRS radios and using them in lieu of business

time service provider, said that he has seen dealers sell FRS radios into the business market, but the radios are not rugged enough.

"The batteries won't hold the charge cycles. Most FRS radios have fantastic battery life, but when you look at using them repeatedly, day in and day out, they won't hold up to business use," he said.

He said that FRS is a good idea as it was intended for private, personal, family use. He sees applications in church and Boy

the ski season, on all 14 FRS channels you find conversations everywhere. Who thought when FRS was introduced it would have that much impact helping people keep track of one another at a ski area or amusement park? But don't dilute it by throwing the business people on there and having them using GMRS and going further into the gray area," he said.

### Equipment safety issue

Denton explained that ITA members with large manufacturing plants worry that widespread use of FRS radios could cause fires in areas with a combustible atmosphere and even if their use fell short of tragic consequences, could bring OSHA-related problems upon companies where they are used.

Although FRS radios may not produce internal sparks, they are not built specifically to suppress sparks the way radios designated as "intrinsically safe" are designed.

Only intrinsically safe radios are approved for use where combustible atmospheres may be found, as in oil and gas facilities and in automobile and aircraft manufacturing plants.

Industrial companies might be expected to control what radios are used on their premises, but Denton said that in a large company with plants across the nation, it could be difficult for the corporate bureaucracy to know what radios are deployed in each plant and to maintain standards.

"If an individual at a plant notices that FRS radios could be purchased at a discount store or from a catalog for less than radios for use on a licensed radio system, it might look good to the managers in the plants who may not understand the regulations or who may not have the legal or technical expertise that someone elsewhere in their company might have," Denton said.

Reubenstein said that it should be the

**"I think they should outlaw all radios that aren't expensive so we can get back to a profit margin."**

radios, and that ITA is supported by business radio manufacturers – although many of the same manufacturers also make FRS radios.

"I think this is a case of one or more manufacturers realizing there are a lot of people using these FRS frequencies who shouldn't be," he said.

"I talk with my two-way radio dealers – and we don't have the number out there that we used to, because the mom-and-pop dealerships are disappearing – but there are two-way entrepreneurs out there selling, and their complaint is that when they sell a hand-held now, it has better quality than the hand-helds of 10 years ago; it sells for a third of the price; it does 10 times as much; and it doesn't break. To make the same income, they have to sell a lot more radios," Reubenstein said.

"I think they should outlaw all radios that aren't expensive so we can get back to a profit margin," he said, tongue-in-cheek.

### Dealer perspective

Gary E. Light, sales manager at KC Wireless, Kansas City, Mo., a radio communications equipment dealer and air-

Scout activities, at amusement parks and in auto caravans.

"Using FRS keeps them from illegally using business frequencies for such applications," Light said.

On the other hand, he sees businesses such as auto dealerships using FRS for their car porters and restaurants using FRS for their hostesses at restaurants, "and that's not what the frequency band was intended for. The hard part for us is when people cross that line and buy GMRS radios off the shelf. Instead of using the 500 mW FRS radios, now they're using 2 W radios that require a license. But to them, it's one and the same, bought through a consumer outlet," he said.

Light said that manufacturers have to consider how much they have undermined their dealers by going to a direct marketing approach while asking dealers for bigger numbers, and at the same time going into markets where the dealers don't have a chance to compete.

"It's fantastic that FRS has taken off the way it has. I talked with people in Aspen, Colo., and they said that during



## DEALERS

responsibility of the corporate safety officer or the dealer selling into that environment to make sure intrinsically safe radios are used. He said that many business radios that could be sold are not intrinsically safe, either.

### Enforcement

Denton wasn't sure how a prohibition on FRS radio use for business applica-

tions would be enforced.

"It's something we need to talk with the radio manufacturers about to make sure an FCC prohibition would be enforced to protect these large manufacturing plants from getting into dangerous situations. I don't know that with regulation alone we could stop businesses from deploying FRS radios as opposed to business radios. But it's worth a look, and a

petition for rulemaking is a good start to get ourselves and the FRS radio manufacturers at the table with the FCC to consider the matter," Denton said.

Robert H. Schwaninger Jr., *Mobile Radio Technology's* regulatory consultant, said that the way FRS radios are used is not likely to be affected by an FCC rulemaking.

Referring to the consumer outlets where many FRS radios are purchased, Schwaninger said, "The genie leaves the bottle at Sam's Club or Costco, and it will not be again contained by FCC rules or admonitions."

With respect to the safety issue, Schwaninger said the focus then shifts to compliance with OSHA regulations and product liability issues.

"I suppose the FCC could mandate warning materials to be included in packaging. I further suppose OSHA inspectors could turn this into an issue. But the root of the problem from a spectrum management perspective is already resolved in favor of open use due to open licensing and open availability," he said.

ITA filed a petition for rulemaking with the FCC on Aug. 22 that was released for public comment by the FCC on Sept. 17.

The deadline for comments to be submitted to the FCC was Oct. 17.

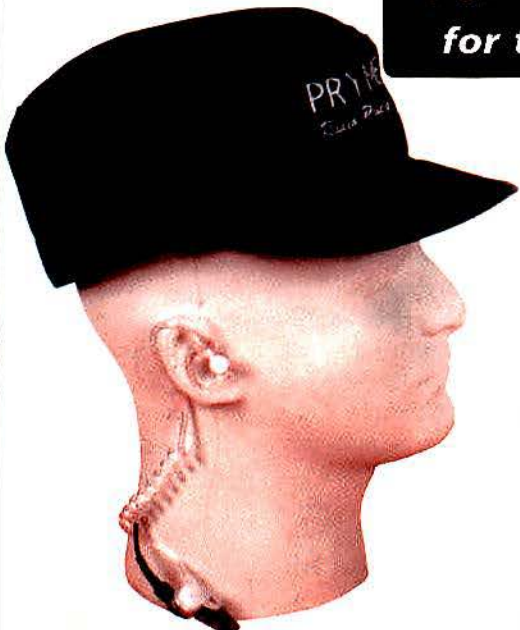
"The petition raises the issue so people can discuss it. It puts ITA, industrial manufacturers, radio manufacturers and others together to make sure we can come up with an industry-wide solution. It's not something we're trying to shake the radio manufacturers down for. We want to make sure that these FRS radios are available to users in times of need and at the same time protect industrial manufacturers from what could be unsafe communications devices in their manufacturing plants," Denton said.

Denton said that Ford, Boeing, FedEx and United Parcel Service are among ITA members that called attention to the potential problem with FRS radios.

### Petition details

Released by the FCC as RM-8499 in WT Docket No. 95-102 to amend Part 95 of the FCC's rules, ITA's petition specifically seeks to prohibit daily business com-

## Surveillance Kits for two-way radios



PRYME Radio Products™ surveillance kits for two-way radios feature a high-quality acoustic eartube made out of durable surgical grade tubing for great comfort and a low-profile look. They also feature heavy grade industrial polyurethane jacketed cable for maximum life in the field. The cabling can be easily concealed under a sport coat or other clothing. For privacy and security, there is no better choice. Both one-wire earphone only and two-wire kits with a PTT / microphone are available.



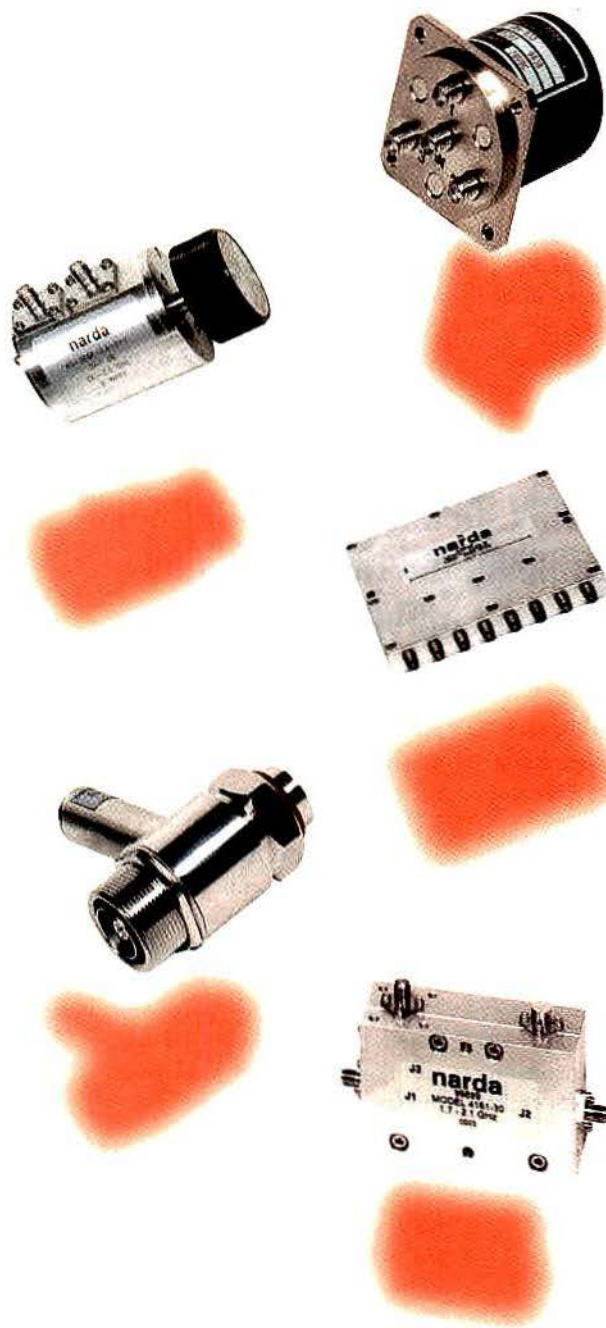
**PRYME®**  
Radio Products

**PRYME Radio Products**  
480 Apollo St., #E  
Brea, CA 92821 USA  
Phone: 714-257-0300  
Fax: 714-257-0600  
Web: <http://www.pryme.com>

Two-way dealers wanted! Call 1-800-666-2654.



Looking for immediate  
delivery of **low cost,**  
**high performance**  
**components?**



**narda**  
microwave-east

an **L3** communications company

Circle 22 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)

You've  
come to the  
**right**  
**department.**  
**dept26.com**

Do yourself a favor.

Click on dept26.com

**dept26**  
narda

and scan our wide selection of high performance components for wireless and many other OEM applications. You'll discover innovative designs. Impressive warranties. And prices that will make you smile. So go ahead. Select your component, pick your quantity and start ordering. We've got everything in stock, so we'll send it right out to you. When the shipment arrives, get ready to be complimented for being so cost effective. How will you handle the compliments? That's your department.



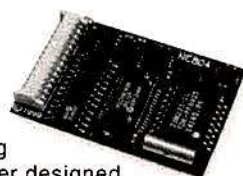
# VOICE **Plus** ENCRYPTION SCRAMBLER

MODEL NC804

**\$129.95**

(1-9 pcs.)

The Model NC804 is a micro-miniature voice-plus pseudo-random rolling code scrambler designed to provide high level security for two-way radio voice communication systems. It's unique digital encryption processing algorithm, plus it's many features makes the Model NC804 a perfect cost effective solution for high-end voice encryption scrambling for commercial users, police departments, public safety organizations and other systems as a defense against unauthorized interception of private and sensitive voice transmissions by casual or even the most determined listeners. The Model NC804 features 8 user code keys with over 20 trillion codes to choose from. Kill disable for stolen or lost radios, over the air programming for changing of units operating parameters without removal from radio. Measuring .90" W x 1.30"L x .22"H, the Model NC804 supports limited space applications and is plug compatible with our popular Model NC802 voice inversion scrambler making it ideal for system upgrades.



- OVER THE AIR PROGRAMMING
- SCRAMBLE/CLEAR MODES
- AUDIBLE ANNOUNCER
- VISUAL INDICATOR
- INTERFACING
- SYNCHRONIZATION
- CODE KEY MEMORIES
- SYSTEM PROGRAMMING
- VOICE QUALITY • COS MODE
- KEY CODES • KILL FUNCTION

For Detailed Specifications or Product Catalog  
contact us by Email: [info@norcommcorp.com](mailto:info@norcommcorp.com) or  
our website: [www.norcommcorp.com](http://www.norcommcorp.com)



**530-477-8400**

**800-874-8663**

15385 Carrie Dr., Grass Valley, CA 95949 USA

## DEALERS

munications on FRS frequencies.

ITA told the FCC that the overcrowding of FRS spectrum by business use is depleting the usefulness of FRS for families and friends, especially in emergencies.

The organization said that it was using its petition to educate the FCC on the growing use of FRS by traditional business users.

ITA wants the government to prohibit business use because the FCC did not originally envision it in the FRS band.

ITA reminded the FCC that the agency's decision to establish the FRS was to "fill a niche market that provided families, friends, and associates the capability to communicate with one another over a very short range, typically a few blocks."

Nonetheless, this reference is to the business activities of the general public, which is drastically different than the activities of businesses and their daily communications," ITA's petition reads.

ITA added that the only statement the FCC made about using FRS for business when it established the service refers to comments made by the Personal Radio Steering Group during the FRS rulemaking proceeding.

"PRSG stated that FRS is a family-oriented radio service that should require a licensing process to protect personal communications from non-personal and non-family interests," ITA's petition reads.

ITA said that it understands the practicality for FRS frequencies and reasoning behind the FCC's unlicensed

**Actually, the only mention of business use  
in all rules pertaining to FRS is included  
in the CB Radio Service definition.**

Specific uses and activities listed by the FCC as examples of FRS operations suggest that FRS is for personal use, not daily business operations.

"For example, the commission expected FRS to be used by outdoor activity enthusiasts, for group outings," ITA's petition points out.

Despite what ITA sees as the FCC's attempt to establish FRS to meet the communication needs of outdoor enthusiasts and families and friends on group outings, Section 95.401(a) of the commission's rules permits "business activities" as an acceptable form of communication in the Citizen Band (CB) Radio Service.

### Business use unintended

Although FRS is a CB Radio Service, ITA said it believed that the FCC did not intend to overrun FRS channels with daily business communications.

"Actually, the only mention of business use in all rules pertaining to FRS is included in the CB Radio Service defini-

tion. Nonetheless, this reference is to the business activities of the general public, which is drastically different than the activities of businesses and their daily communications," ITA's petition reads.

ITA added that the only statement the FCC made about using FRS for business when it established the service refers to comments made by the Personal Radio Steering Group during the FRS rulemaking proceeding.

"PRSG stated that FRS is a family-oriented radio service that should require a licensing process to protect personal communications from non-personal and non-family interests," ITA's petition reads.

### Personal/business use incompatibility

"Business users, on the other hand, need communication anywhere from five to seven days each week, every week of the year, sometimes every minute of the day. These business users could be using their system for safety of life communications, general safety applications in a manufacturing plant, or for maintenance purposes on an assembly line," ITA's petition reads.

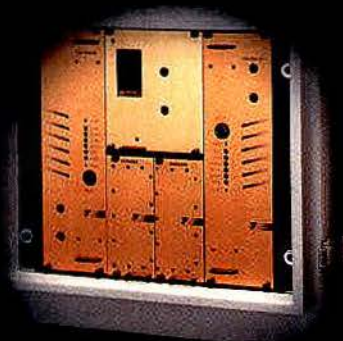
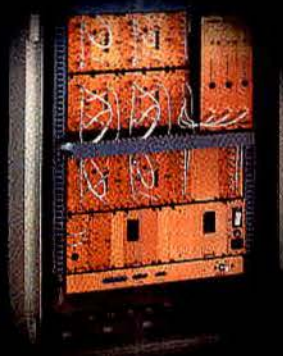
"These business systems are drastically



broad-band amplifiers

vehicular repeaters

channel-selective repeaters



[www.FUTURECOM.com](http://www.FUTURECOM.com)



**RF** coverage *by design*

1-800-701-9180

Circle 24 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)



# GET SMART

INFRASTRUCTURE • APPLICATIONS • SECURITY • INTELLIGENCE



***Mobile Radio Technology* magazine and its trade show partner IWCE have joined forces online.**

**Everything you need to know. One website.**

**Access daily breaking news and IWCE show information.**

**Learn about IWCE's powerful conference and speaker roster, browse back issues of *Mobile Radio Technology* and get in touch with the leading provider of industry news.**

**FOR MORE INFORMATION VISIT US AT**

**WWW.IWCE-MRT.COM**



different from personal communications in that they need reliable, accurate, efficient, constant communications, with a minimal interference potential and a longer range of service.

"The fact remains, unfortunately due to the lack of clarity in the rules, that some traditional businesses are using FRS units for their daily business needs, which limits the possibility of personal communications as envisioned for FRS," ITA told the FCC.

ITA said that if a single business were to deploy multiple FRS units in a given area, it could easily congest the spectrum in that area.

If an individual in the same area were to use an FRS unit, communication might be impossible because of overcrowding by the business users.

ITA's petition gave an example of amusement park employees using FRS instead of licensed business radios finding it difficult or impossible to communicate during an emergency because of heavy use of FRS by families in the park.

"Businesses, if restricted from FRS, would be required to be licensed on traditional business radio spectrum, which is a more reliable alternative for all involved. The absence of business users would then free the FRS spectrum for the intended user (i.e. families) leading to a potentially safer environment for each type of user, personal and business and satisfying the public interest overall," ITA's petition reads.

ITA's petition asks the FCC to initiate a Notice of Proposed Rulemaking to restrict the use of daily, business-oriented private wireless operations on FRS channels.

Several FRS radio manufacturers were contacted about the ITA petition. Most were unable to provide a spokesperson for comment.

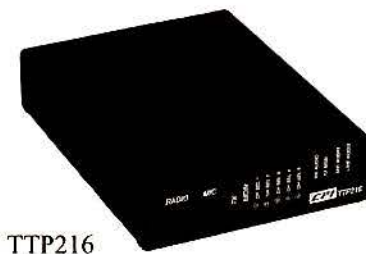
A spokesperson for Kenwood Communications, which makes both business and FRS radios, said that the company had nothing to add to the story.

A spokesperson for Midland Radio, which also makes both types of radios, said that his company had not yet seen the petition and could not offer comment, except to say that he expected that the FCC would give the petition a hearing and determine whether it has merit. ■

## Multi-Frequency Tone Remotes and Termination Panels

NEW

NEW



TTP216

TR10-16F



CPI's TR Series- Multi frequency tone remotes and TTP216 tone termination panels can be used to control up to 16 frequencies on many radio systems. The TR Multi-Frequency unit is an EIA standard tone remote available in 4 or 16 frequencies and can be added to existing EIA standard tone systems. Monitor, intercom, front panel PTT, crossmute, and parallel status updating are standard features. Unit available in ash or black. The TTP216 will control up to 16 frequencies on many radio systems and is available with plug-in connectors for many Kenwood, Motorola, and other radio models. For more information on these units or CPI's complete line of DC, Tone, Local Extension, and Multi-channel remotes and termination panels please call us or visit our website.



941 Hensley Lane Wylie, TX 75098

(800) 869-9128 FAX (888) 437-5360

www.cpicomm.com

Circle 25 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)

## Reliable Amplifiers



**5 UHF 100 Watt  
Amplifiers In  
10.5 Inches of  
Rack Space**



sales@CrescendTech.com  
www.CrescendTech.com  
800-USA-MADE  
800-872-6233

Crescend offers the most reliable amplifier available for the Land Mobile market. Our new series of amplifier's are built with LDMOS transistors. Our LDMOS amplifiers are more rugged because:

- LDMOS transistors have higher VSWR rating than bi-polar transistors,
- Amplifiers operating voltage of 28 volts DC lowers means lower current through devices.
- Better Thermal Properties- the LDMOS transistors are resistant to thermal runaway.
- Microstrip Design- We utilize microstrip matching techniques to reduce tuning capacitors.

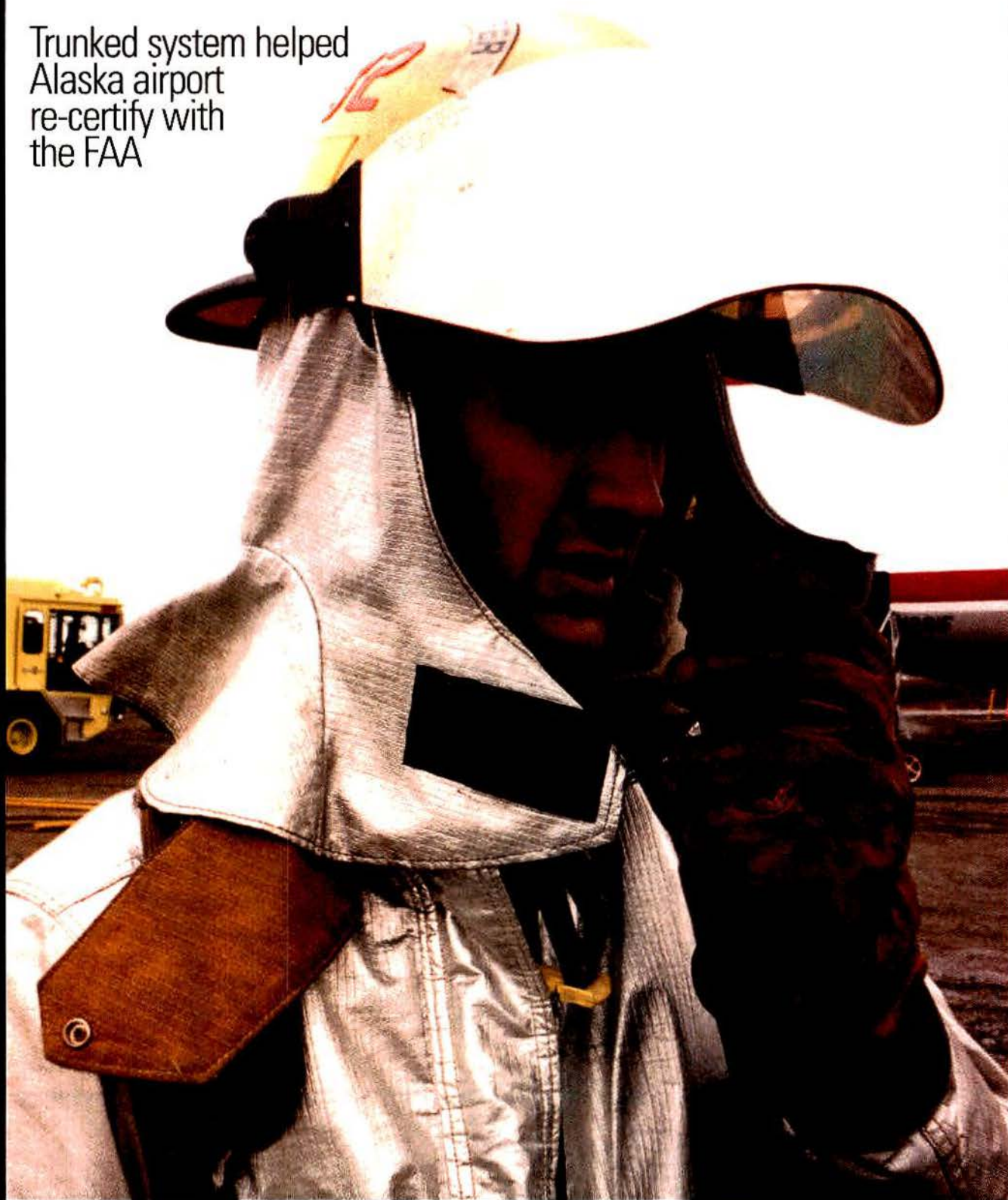
Circle 26 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)



AIRPORT RESCUE Donald E. Koehler

# Radio boosts readiness

Trunked system helped  
Alaska airport  
re-certify with  
the FAA







Opposite page, communications are just as important as a firefighter's thermal suit. Above, the new trunked radio system allows many different sections to coordinate an attack on the burning aircraft.

**A**nchorage International Airport performed a rescue exercise this year—as it must, once every three years, to retain its operations certification with the FAA.

What made this year's exercise different compared previous exercises was the sheer size of the play, the number of agencies involved and level of complexity.

The previous exercise of this type revealed several areas for improvement.

The addition of new participants and a new trunked radio system has made a tremendous difference.

### Background

Anchorage is a leading cargo operations airport for the nation, handling far more

traffic than the size of the city would normally indicate.

The location itself complicates rescue work. At the end of the major north-south runway is Cook Inlet, a body of water at a frigid temperature that can quickly kill accident victims.

Not long ago, a helicopter crew died when their craft fell into the inlet, a tragic reminder of the dangers of flying in Alaska.

A near miss this winter with a foreign cargo jet pointed to the need for an open water drill with all of the local public safety agencies involved.

Cook Inlet has fast (up to 6 kts), wide-ranging tides (38+ feet); murky, cold water; and heavy ice in winter. Its location straddles multiple jurisdictions.

The Anchorage fire department, the airport, the Alaska Air National Guard,

the U.S. Army Aviation and the U.S. Coast Guard all have worked rescue efforts in the inlet over the years.

Recognizing its responsibility and the unforgiving environment for rescue operations, the airport management invited the major agencies to play in this required exercise.

The helicopter crash had shown the need to ensure that all local agencies could communicate and move quickly.

The exercise also offered a chance to bring diverse rescue elements together.

For example, the airport has acquired two-seat, high-speed hovercraft for operation in the inlet.

Designed to rapidly place rafts at the scene of a crash, they provide an immediate scouting ability when weather is marginal for low-level helicopter operations.



Moreover, ice pack is less of a factor in rescue operations with the hovercraft, another good reason to include them in the exercise and test possible hovercraft deployment strategies.

A new style of heli-borne rescue basket also had arrived in Anchorage, and the exercise represented a chance for rescue crews to practice removing multiple victims in a single pass.

Finally, a fire training simulator (actually a large commercial airframe with engines removed) for ground firefighting operations had shortly before been put into place. It was added to the mix to test land, sea and air coordination.

Using a simulated midair collision off the end of the main runway, the exercise was intended to force the air traffic control, airport operations and emergency operations center staff at the airport to call out and communicate with an almost bewildering array of land, sea and air rescue craft.

In addition to airboats; high-speed, two-man hovercraft and rescue boats; helicopters from the U.S. Coast Guard, U.S. Air Force, Alaska State Troopers and local air operator "ERA Helicopters" participated.

Victim transport and tracking also were tested.

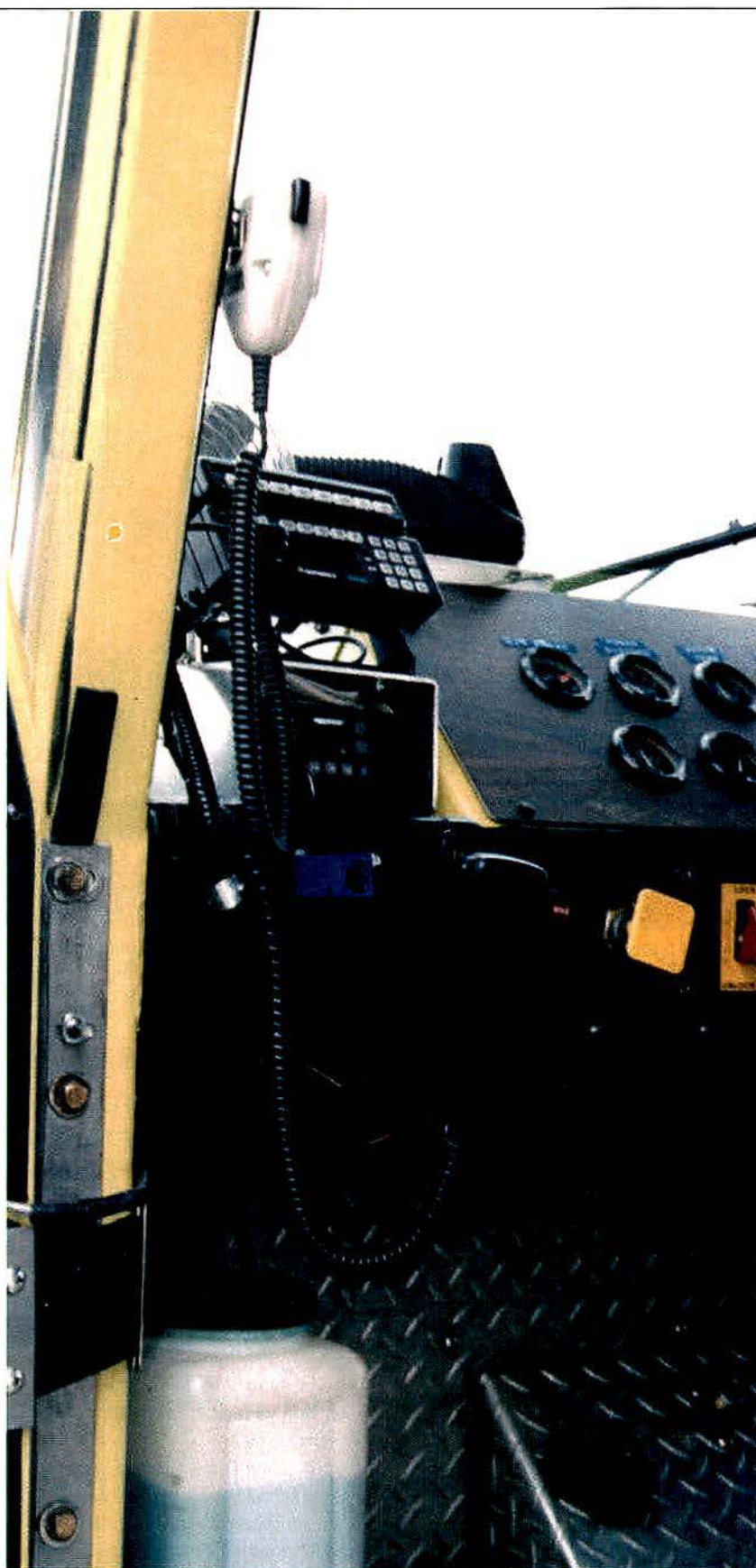
### Radio communications

The radio equipment used by agencies in the exercise operated on the VHF and UHF air bands, the VHF marine band, VHF and UHF land mobile radio bands and on a new trunked radio system.

Workers in the EOC had their hands full coordinating the activity safely. Fixed, mobile and hand-held equipment was used.

About the only thing missing for the exercise was a direct satellite link, but a link of that type was put in place later as part of a follow-on "weapons of mass destruction" reaction demonstration.

"Victims" from both the water and land "crash sites" were transported to multiple hospitals. Interestingly, amateur radio operators handled hospital intercommunications, victim dispatch and tracking—no doubt a continuing legacy of the 1964 Alaskan earthquake. Communications



New radio equipment looks at home on the dash, and close at hand for the driver.



with ambulances, large city busses and other patient transports was worked with amateur radio operators riding along to tell drivers when and where to pick up the next set of passengers.

Although this was a fairly low-tech approach, it worked well, exercise planners said.

At the end of the day, Anchorage International had shown once more they had the 'right stuff' to handle even a major catastrophe.

They also had made the point interoperability was no longer an option in post-Sept. 11, 2001, America.

Civil, military and state aircraft were able to communicate and coordinate with sea and land based rescue personnel, showing the long hours of planning have paid off.

In the near future several more major exercises with city and local military teams are scheduled, and those results should prove to be equally interesting.



Part of the communications equipment found in the airport EOC -- note vital supplies, spare batteries, chargers and computers for coordination.



**SINCLAIR**  
We have you covered.

**Reliability**



**Security**



Wherever

**Antennas**  
**Filters**  
**Duplexers**  
**Multicouplers**  
**Combiners**



**Coverage**



UNITED STATES 1 800 288 2763  
CANADA 1 800 263 3275

[www.sinctech.com](http://www.sinctech.com)

**Customization**

Circle 27 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)



# Weapons of mass destruction:

Likelihood of accidents, attacks prompt comm concerns

**T**he risk of technology accidents, such as fuel spills and toxic gas leaks, has been with us for some time. As industrial technology advances, materials used seem to become more deadly.

Many police and fire agencies have done a good job of training and reacting to technology accidents. Local, and in some cases state, HAZMAT teams train regularly.

The federal government has enacted laws such as the Emergency Planning and Community Right to Know laws (40CFR AKA SARA III), and resulting regulations have worked well to protect the public and safety workers.

New phrases are coming into the lexicon of emergency responders and planners, such as *weapons of mass destruction*, *low-intensity conflict* and *asymmetrical combat*.

An increased awareness resulting from the Sept. 11, 2001, terrorist attacks has spread across America. Credible threats for chemical, biological and nuclear attacks have been discerned.

The April 19, 1995, bombing of the Alfred P. Murrah Federal Building in Oklahoma City, the March 19, 1995, release of deadly sarin gas in a Tokyo subway station, reported callout responses for the Department of Energy's Nuclear Emergency Search Team and the Sept. 11



The commander of the 103rd Civil Support Team explains the unit mission.





**DC to daylight, this van carries the data links needed to inform and save lives.**

attacks have shown that reality sometimes matches the threat.

How would a city or county emergency manager respond to an emergency involving a biowarfare agent, toxic gas or a so-called "dirty bomb?"

Local and even national resources can be taxed, and information is critical in responding to such emergencies.

The Army National Guard's "Civil Support Team" soldiers have the training and HAZMAT equipment to enter the "hot zone" and test for nuclear, biological or chemical hazards. Most importantly, these teams are available to support small jurisdictions that may not have HAZMAT trained or equipped workers.

A National Guard brigadier general with headquarters in Norfolk, Va., commands 27 teams located across the country. These teams may be nationalized on the order of the president and mobilized to support the Federal Emergency Management Agency. The teams have no other function than to measure, detect and report their findings to the local incident commander. They are not part of any counter-terrorism forces.

(To learn more about this new Army Guard unit and the role they play in national defense, see <http://call.army.mil/products/nftf/novdec01/novdec01ch1.htm/>.)

The teams need communications to perform their duties, for team safety and

to disseminate information to civil authorities for decision-making.

I watched members of the 103rd Civil Support Team from Fort Richardson, Alaska, in action. In addition to the air samplers, ray counters and "moon suits" they carry to the field, the communications suite they carry was impressive.

nications suite.

During the exercise, the team worked rapidly to set up shelters, protective equipment, monitoring equipment and communications. The Ku-band link was up in less than 30 minutes – not bad, considering the site was not surveyed. The Unified Command Suite (a portable van)

## The Alaska team's radios were Motorola XTS 300s operating on 403–470 MHz ...

Equipment ranges across all services from VHF and UHF land mobile radios to a secure satellite link to the National Command Authority (the president).

The Alaska team's radios were Motorola XTS 300s operating on 403–470 MHz, and the team has the capability to operate on 470–520 MHz and 851–868 MHz. The team also carries IMMARSAT-B portable voice-and-data terminals.

To back up the commercial sitcom equipment, the team has a van-mounted Ku-band military satellite terminal. For use when all else fails for beyond line-of-sight communications or for long-haul communications, the team has an HF SSB capability. Portable scanners and cellular telephones round out the commu-

holds a 15 kW generator, environmental control unit, satellite gear and equipment to provide secure communications. To see specifically what equipment and skill sets the team has, check out <http://www.ci.anchorage.ak.us/iceimages/healthchd/103dCSTGeneralFactSheet1.pdf>

Besides exercises, the Alaska Team has been called out to assist small communities with identification of HAZMAT materials of unknown nature. The remains of equipment, munitions and materials from WWII, Korea and the Cold War lay scattered across Alaska, so the 103rd Civil Support Team is sure to get its share of support opportunities right here at home. ■







# Where are they now?

**Track public safety workers  
with portable two-way radios**

**by R.A. Jetter**

**T**he unmarked, plain-sided, 18-wheeled tractor-trailer crawled through city traffic, its driver unaware of two black, dark-windowed SUVs tailing it.

The portable radio on the tractor's seat squawked with the buzz of everyday noise and traffic.

"Everything quiet?" the speaker crackled.

"10-4. It is. Ten miles to destination," acknowledged the passenger. "Arrival in 15 minutes."

In the trailer, its cargo, one of the most hazardous agents known to man - VX nerve gas - had been loaded into 55-gallon barrels; 11,000 gallons shipped anonymously. Manned only by the driver and one well-armed passenger, a guard, the transporter headed for the munitions base just on the outskirts of the city. The deadly cargo, scheduled for disposal there, would be burned in the compound's incinerators.

Near the sparse industrial area outside the city, the tractor-trailer topped a small hill. Ahead, sprawled across both lanes of traffic, a pick-up truck lay overturned and a damaged auto sat idling on the shoulder. In the middle of the road, two men argued as a third man, his face bloody, held a cellular phone to his ear, and a fourth man lay on the ground, apparently unconscious as a result of the accident.

The tractor-trailer came to a halt close to the accident, and the guard grabbed the portable radio from the seat, opened the door and swung down from the cab to render aid. Seconds after he approached the crashed truck, the two black SUVs that followed pulled directly behind the trailer and stopped, effectively canceling any room for the truck driver to back up or high-tail it from the scene.

Eight men, carrying Uzi's, hurriedly exited the SUVs and

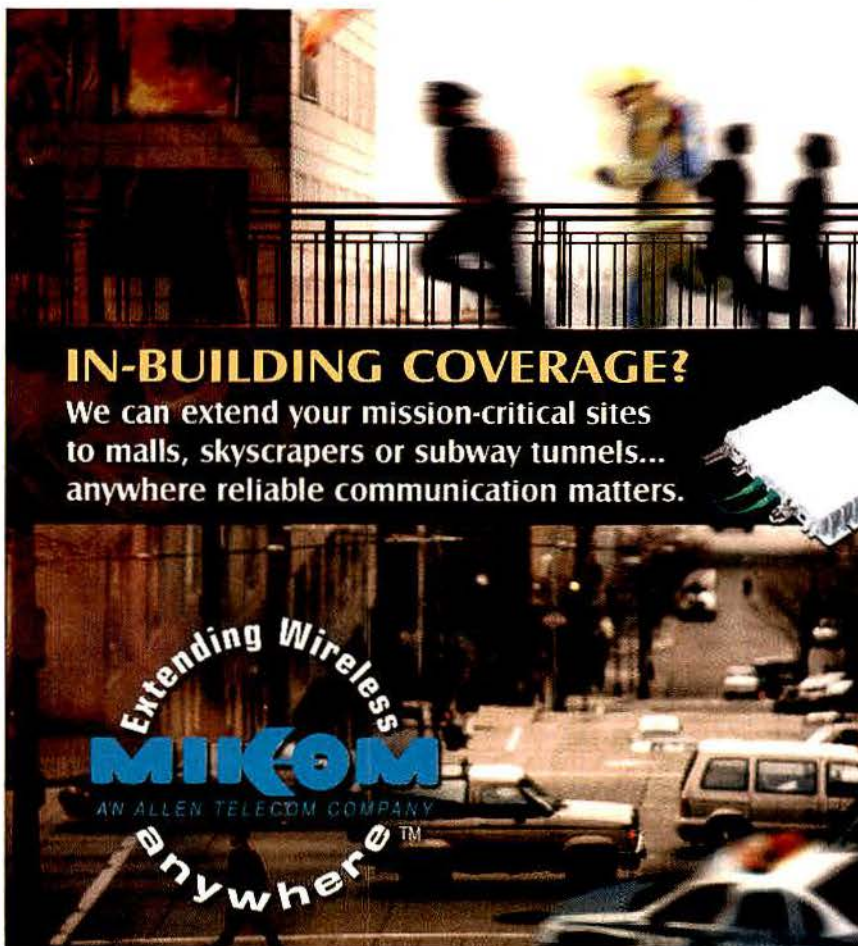


descended on the tractor-trailer. The four men involved in the accident dropped their pretense, brandished their weapons, seized the man who was going to help them and approached the tractor-trailer.

The truck driver gunned the engine to leave the scene. The side windows were shot out, and he was ordered from the cab. Stalling, he opened the door slowly, allowing enough time to step on an emergency alert foot-pedal attached to the floor. The emergency system sent an immediate GPS signal to its base station indicating help was needed.

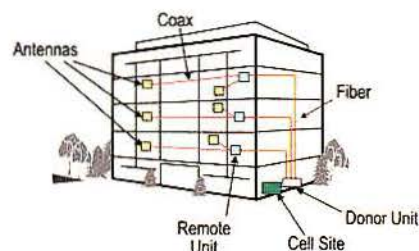
A loud, flashing alert, picked up by the base station, displayed a map pinpointing the exact location of the truck. Law enforcement agencies were informed of a "hijacking in progress" and sent a SWAT team. Soldiers of the military installation, just miles away, received the alert and responded.

A vicious firefight ensued, and the terrorists were subdued before they could escape with the truck and its deadly contents. Neither the passenger nor the driver,

**IN-BUILDING COVERAGE?**  
We can extend your mission-critical sites to malls, skyscrapers or subway tunnels... anywhere reliable communication matters.

**Extending Wireless**  
**MIKOM**  
AN ALLEN TELECOM COMPANY  
**anywhere™**



**MIKOM**, the world leader in coverage systems, understands the importance of mission-critical radio communications. We have improved in-building wireless communication since 1992, and have designed and installed anything from small office applications to many large in-building systems, such as optical systems for airports and Olympic venues.

Our range of products and services, using state-of-the-art optical and coaxial technologies, provides high-performance, reliable systems for any in-building or tunnel coverage need. Our turnkey services remain unmatched in the industry.

When you need reliable radio communications, you can rely on MIKOM. **With MIKOM, you are covered.**

**Toll Free (888) 297-6433**

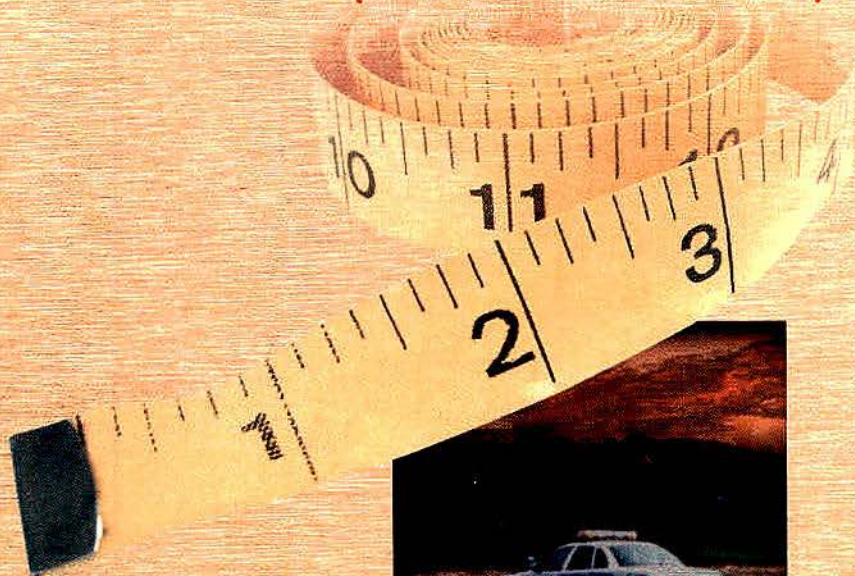
email: [us\\_mikom\\_sales@allentele.com](mailto:us_mikom_sales@allentele.com)

**[www.mikomus.com](http://www.mikomus.com)**

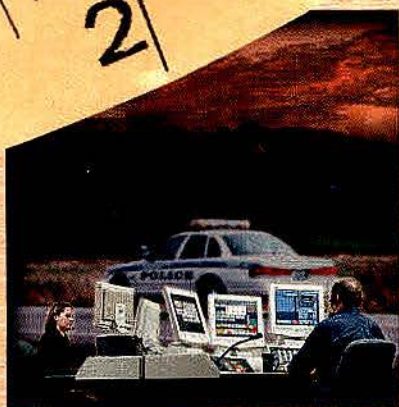


# S, M, L, XL...

(OR EVEN XXLARGE!)



**Whatever the size,** Zetron dispatch consoles and 9-1-1 telephone systems are helping Public Safety agencies protect their communities. And we can help you! Zetron can tailor a dispatch console system that precisely fits your requirements for capacity, capability, and cost.



#### **Unlimited Capacity**

From a single radio dispatch console to our largest Acom digital system, capable of over 1500 channels and 128 operator positions - a Zetron solution can be scaled to the correct capacity to meet your requirements.

#### **Comprehensive Capability**

Innovative technology ensures a full range of feature-rich workstations. We'll custom-configure a system with the modules, features, interfaces, and technology that fits your need and budget.

## **Dispatch Systems Tailored to Fit**



Mission-Critical Communication Systems

[www.zetron.com](http://www.zetron.com)

Phone: 425.820.6363 Fax: 425.820.7031 Email: [zetron@zetron.com](mailto:zetron@zetron.com)

Circle 29 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)



## TECHNICAL SPECIFICATIONS

### RadioTrac GPS Module

Receiver: LI, C/A Code (1575 Mhz)

Channels: 12

Sensitivity: -175 dBW

Position Accuracy: 25 meters

### RadioTrac Base Station

Size: 6.62 x 4.0 x 0.90 inches

Weight: 3.0 oz

Power: 12.0 VDC

Current Drain: 120 mA nominal

Operating Temp.: -22 degrees F to 170 degrees F

### Computer System Requirements

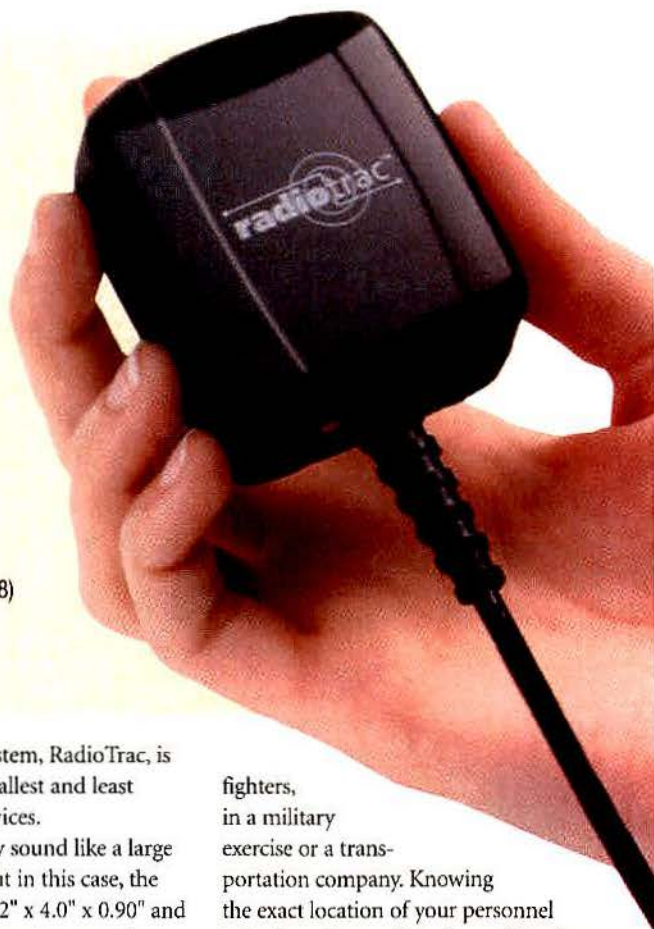
Pentium processor or better

700 MB available disk space

Super VGA monitor (with the screen resolution set to at least 1024 x 768)

Windows 95, 98, 2000

Specifications subject to change without notice



who credited the newly installed alert system for saving them, was hurt.

Fiction? Quite.

Hypothetical? In today's terrorist-prone world - definitely not.

With current technology, such a situation can be rectified at, literally, a moment's notice.

A specially designed miniature GPS module (2" x 2 1/2" x 1") can be plugged into any hand-held radio or walkie-talkie, allowing the base station to track one person, a mobile truck, fire engine, police or military unit with clarity and pinpoint

accuracy. One such system, RadioTrac, is among the world's smallest and least expensive tracking devices.

A "base station" may sound like a large piece of equipment, but in this case, the base station is only 6.62" x 4.0" x 0.90" and easily portable. It can be set up anywhere.

Integrating the latest GPS technology with patented encoding and decoding techniques, mapping software, an advanced 12-channel GPS with a patch antenna and a receiver with a high-speed modem and microcomputer, this system can be used in fleets of school buses or a shift of forest fire

fighters, in a military exercise or a transportation company. Knowing the exact location of your personnel helps keep them safe and, possibly, alive.

The tracking system uses existing mobile or hand-held two-way radio systems. The manufacturer claims that it is the only technology available that can interface on any walkie-talkie, made by any manufacturer, operating on any frequency.

RadioTrac's parent company, Waltham, Mass.-based CyTerra, has handled projects for the U.S. Army, U.S. Marine Corps and U.S. Customs Service to develop technology to detect bombs and metal and plastic land mines. It has developed low-cost, low-power airport perimeter detection radar; automated explosive detection luggage check systems and biological and chemical weapons detections systems.

CyTerra employs engineers and scientists trained in physics, chemistry, ultra-trace detection, thermodynamics, RF design, radar, electronics, software and material science.

The RadioTrac system is turnkey and includes all hardware and mapping software. No monthly fees or "ping" fees accrue, as compared with traditional cellular-based AVL systems.

—radiotrac@cyterracorp.com

## What's Your Maximum Permissible Exposure

### The Most Advanced Solution for Prediction of Exposure to Non-Ionizing Radiation

- Determine Compliance with Exposure Standards
- Identify Areas That Exceed Exposure Limits
- Helps Determine The Most Efficient Ways to Correct Problem Areas

#### ComSiteMPE

Provides site owners and managers improved site safety and reduced risk by providing a quick and efficient way to evaluate human exposure to non-ionizing radiation.

**COMSITE**  
MPE

To learn more, visit our website and register for an on-line seminar on how to manage your Maximum Permissible Exposure

[www.rec.com/mpe](http://www.rec.com/mpe)

For More Information call 1.800.247.4796  
email - [comsite@rec.com](mailto:comsite@rec.com)



Circle 30 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)





Construction

# Connectivity Reliability Flexibility

For every unique business and organization, Tait has a product or network solution that will meet their needs. With over 34 years of communications equipment experience, our extensive product portfolio mirrors the diversity of the markets our customers serve.

- Portable Radios
- Mobile Radios
- Portable Repeaters
- Base Stations
- Mobile Data
- Networks
  - MPT 1327
  - Quasi-Sync Simulcast

When you need it most...

**TAIT DELIVERS!**

Circle 31 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)

TAIT NORTH AMERICA INC 15740 Park Row Suite 450 Houston, TX 77084 [www.taitworld.com](http://www.taitworld.com) 1.800.890.8248



# Power supplies: turned on

### GE Signature 500 series

GE Digital Energy has announced the availability of the Signature 5000 Series, a new line of uninterrupted power supply systems for the North American marketplace.

The Signature 5000 Series is a three-phase UPS system that provides critical power protection for a range of markets and applications, including healthcare and financial institutions, industrial and biotechnology manufacturing facilities, transportation and telecommunication operations, and information technology systems.

The first phase of the North American Signature launch will be for products ranging from 10 kVA to 150 kVA.

Additional products within the Signature Series are expected in 2003.

The Signature 5000 Series operates in a double-conversion mode, with true online voltage and frequency independent operation, resulting in maximum levels of power reliability.

In addition, the Signature 5000 systems can be paralleled by up to eight units using GE's unique Redundant Parallel Architecture, achieving redundancy or increased power capacity in a flexible and cost-effective manner.

The Signature 5000 Series is built upon GE's UPS technologies, which include extremely low output voltage distortion reducing the need for over-sizing the UPS, space vector modulation resulting in faster

response and higher efficiency, a output isolation transformer separating the utility power from the load providing greater critical power protection, and superior battery management enhancing the life of the battery and reducing operational costs.

New features of the Signature 5000 Series include:

- Front-service access reducing operational footprint, maintenance and repair costs
- Enhanced cooling design increasing reliability and availability
- Integrated input filter reducing the input current distortion
- Automatic start-up procedure with user-friendly interface

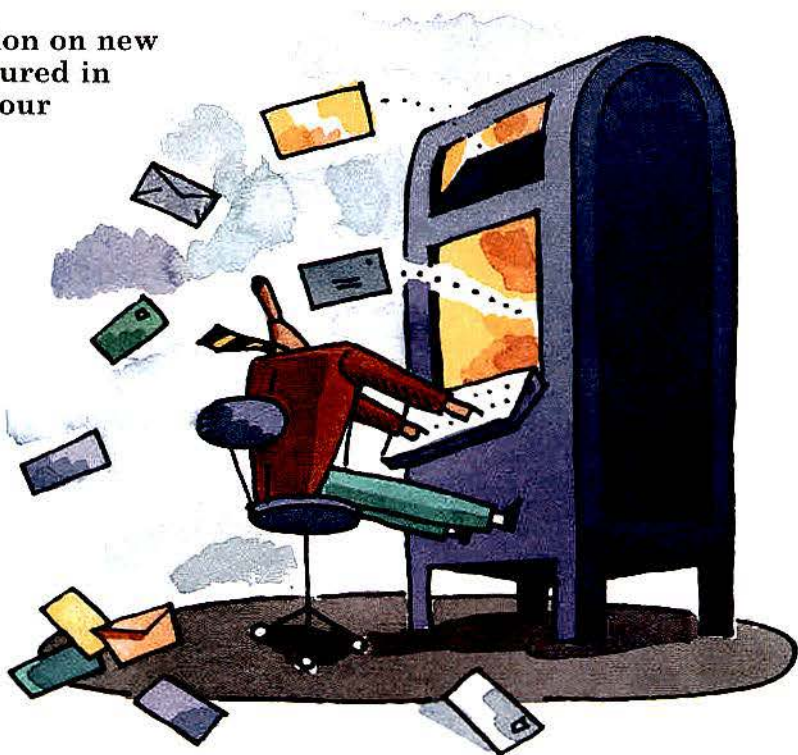
## Get the advertiser information you want... instantly!

Now you can find information on new products advertised or featured in **MRT magazine** — right at your desktop.

With our new **FREE** product information service, you can **search online** by company name, reader service number or page number to find the products/services in which you are interested.

Just go to **mrtmag.com** and click on the "**free product information**" button on the top left side of the site. Or go directly to:  
**freeproductinfo.net/mrt**

Get the information you want — and need — fast. Go to **mrtmag.com** today!







## Kepco RKW open-frame series

Kepco has introduced its new, 15-watt, single-output RKW open-frame series power supply with output voltages from 3.3 Volts to 48 Volts d-c. All models conform to EN 60950 for the Low Voltage Directive and meet EN 55001-B and EN 55022-B standards for conducted and radiated emissions.

Input harmonics are suppressed to meet EN 61000-3-2 by means of an active Power Factor Correction (PFC) circuit and the RKW meets all applicable Immunity and Susceptibility standards, thus eliminating a major impediment to CE Marking of the customer's end product.

## Specifications at a glance:

Voltage: 85-265 VAC  
Line frequency: 47-66 Hz  
Operating temperature: -10 to 50 C  
Storage temperature: -30 to 75 C  
Operating humidity: 10-95 % RH  
Storage humidity: 10-95 % RH



## Ault BL600 Li-Ion charger

Ault Inc. announced its BL600 Lithium Ion stand-alone battery charger designed for portable electronic devices.

The new charger offers users an easy-to-use, safe charging system for digital cameras, PDAs, portable CD/DVD players and cellular phones, as well as for electronic devices for the medical, scanning and instrumentation markets. Set in a desktop configuration for charging two, three or four cells at once, the BL600 helps prevent battery and device damage

with its inrush limiting and short-circuit protection features.

## Specifications at a glance:

Voltage: 100-250 VAC  
Line frequency: 47-63 Hz  
Operating temperature: 0 to 50 C  
Storage temperature: -30 to 85 C  
Operating humidity: 5% -95% RH  
Leakage current: <0.75 mA at 265 VAC  
50 Hz

## RUGGED 75 AMP POWER SUPPLY



- Anchors NEW DuraComm "DPS" Series Line
- Now in 15, 30, 45, 55 and 75 amps @ 12VDC (adjustable output)
- 15.5 and 25 amp versions @ 24VDC (adjustable output)
- Protected against brownout and AC spike input to 190 volts
- Reverse battery polarity, over-current & over temp protected
- UL/CUL Listed

Microprocessor controlled automatic 3 stage smart charger option can be used with all DPS converters ... increases charge capacity, decreases charge time, prevents over-charging.



Contact your communications distributor or call or fax us Toll Free

Phone 1-800-467-6741 Fax 1-800-825-1403

**DuraComm®**  
CORPORATION

203 W. 23rd Ave.  
North Kansas City, MO.  
64116

On the Web at [www.duracomm.com](http://www.duracomm.com)  
Email: [duracomm@duracomm.com](mailto:duracomm@duracomm.com)

## WIND POWER

Enhance your PV system with **AIR Industrial**

### Benefits

- Power night and day
- Reduce seasonal fluctuations
- Reduce total system costs

### Monthly Average Output

- 9 mph average: 15. kWh
- 11 mph average: 29.6 kWh

### Specifications

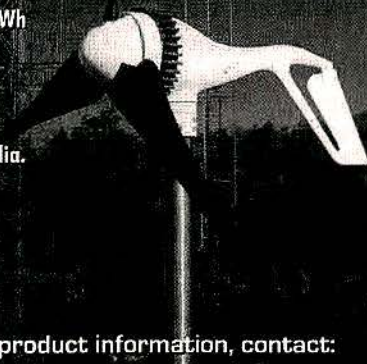
- Rated 400 watts
- Only 14 lbs. (6.3 kg)
- 45 inch (1.14 m) blade dia.
- Only two moving parts
- C40 Regulator
- External Resistive Load

### 3 Year Warranty

For distributor and product information, contact:

**Southwest Windpower**

2131 N. First Street • Flagstaff, Arizona 86004 USA  
Tel 928-779-9463 • Fax 928-779-1485  
[www.windenergy.com](http://www.windenergy.com) • E-mail [info@windenergy.com](mailto:info@windenergy.com)



NOW WITH  
EXTERNAL  
REGULATION!



## PRODUCTS

# Motorola palms new handheld

Motorola Inc. announced the introduction of Premier Handheld 2.0 for Pocket PC, a software application that provides law enforcement officers with wireless access to important information through several portable platforms. Premier Handheld 2.0 is part of Motorola's extensive portfolio of integrated communications and information solutions to address mission-critical public safety and security requirements worldwide.

Premier Handheld 2.0, the latest version of Motorola's wireless handheld application, uses the Pocket PC operating system. Premier Handheld 2.0 extends the functionality of Premier MDC messaging to portable clients, by putting critical information in the hands of police officers on foot, bike, horseback and motorcycle patrol.

As the portable alternative to a mobile data computer, Premier Handheld 2.0 allows officers to quickly and easily view information from State, National Crime Information Center (NCIC) and National Law Enforcement Telecommunications Center (NLETS) databases. The system also enables officers equipped with a Personal Digital Assistant (PDA) device to access and send status updates to the local computer aided dispatch (CAD) system.

This feature reduces radio-dispatching traffic and provides a record for the officer to refer back to.

Premier Handheld 2.0 software also can run queries against the local records management system (RMS), which allows officers to learn if a suspect could be potentially dangerous or if a vehicle is stolen.

Motorola is a leading provider of integrated communications and information solutions with more than 65 years of experience in meeting the mission-critical requirements of public safety, public service, government and enterprise customers worldwide.

The company's extensive public safety and security portfolio includes: interoperable two-way radio communications solu-

tions with encrypted security capabilities; command and control equipment and software applications, including computer-aided dispatch, 9-1-1 and 3-1-1 systems, and automated records management systems; identification and tracking solutions, including palm/fingerprint and photo-imaging systems, as well as comprehensive information management capabilities for criminal justice and civil needs; and physical security and monitoring solutions, including remote monitoring and diagnostics.

[www.motorola.com](http://www.motorola.com)

### RF rolls out new wireless LAN products

RF Industries has introduced a new line of coaxial connectors, antenna jumpers and antennas for Wireless LAN (802.11a) & Wi-Fi (802.11b) equipment.

Network connectivity is provided for on-the-road professionals by RFI's new MC, MC switch and MHF (mini-coaxial) connectors. These connectors mate with the popular 2.4 GHz (Wi-Fi) and other WLAN ISM PCMCIA cards for off-the-



shelf compatibility with wireless products from companies such as Apple, Avaya, Buffalo, Dell, IBM, Lucent, Orinoco and Toshiba. RFI's new connectors link these popular 802.11a and 802.11b cards with an external antenna, helping optimize wireless signal reception on laptops and other mobile hand-held devices.

Intra-office wireless compatibility is provided with a complete line of Reverse

Polarity and Reverse Thread BNC, MMCX, SMS and TNC connectors.

These connectors mate with popular 802.11a and 802.11b products, including AP's bridges, routers and switches manufactured by Alvarion, Apple, Avaya, Buffalo, Cisco, D-link, Enterasys, Hyperlink, IBM, Intel, Lucent, Orinoco/Proxim, Samsung, SMC, Symbol, Toshiba and Zcomax to maximize the signal strength reception of the in-office wireless network.

[www.RFIndustries.com](http://www.RFIndustries.com)

### MAXRAD unveils dish, antenna line

Hanover Park, Ill.-based MAXRAD, Inc. announced the addition of two complete antenna series to its XtremeWave line of broadband wireless access antennas for the 2.4 GHz and 5.8 GHz ISM bands. The new and improved MPR prime focus parabolic reflector antennas and MYP enclosed yagi antennas will replace all previously offered models in those lines.

The XtremeWave MPR series comprises two 2.4 GHz and one 5.8 GHz models offering gains of 21, 25 and 29 dBi respectively. Their new and improved electrical design suppresses unnecessary sidelobes and directs all energy towards their target area of coverage thus minimizing interference and providing outstanding data throughput. They also feature an extremely robust mounting structure in which the mount is bolted to the dish in an eight star pattern, providing a very robust installation and preventing oscillation that could result in signal deterioration. The 24-inch dishes are shipped in a box measuring less than 108-inch girth and width, for reduced shipping and storage costs.

Similarly, the MYP series includes four models with gain ranges from 10 dBi to 15 dBi at 2.4 GHz frequencies. They feature matched principal plane beamwidths with excellent sidelobe suppression and cross-polarization rejection of more than 20 dB. The result is superior signal quality with enhanced gain performance and minimal





interference from neighboring radiators. A 30 dB front-to-back ratio permits less physical separation on the tower thus adding mounting flexibility at installation sites where space is limited. These antennas are field adjustable to allow vertical or horizontal polarization for optimal orien-



tation and no co-channel interference.

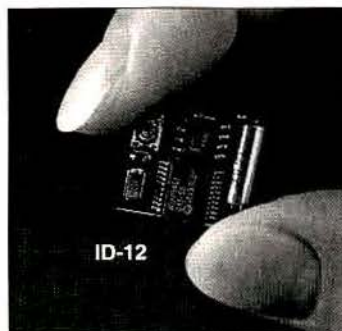
The XtremeWave MPR parabolic reflector antennas and the MYP enclosed yagi antennas are available through MAXRAD's network of authorized Value Added Distributors and distributor partners or online through MAXRAD's Online Distributors Partners.

[www.maxrad.com](http://www.maxrad.com)

## Digital ANI MDC-1200® Signaling



ID-1201



ID-12

**CSC CONTROL SIGNAL**

[www.ControlSignal.com](http://www.ControlSignal.com)

Control Signal's ID-12/1201 is an economical MDC-1200 ANI system. The ID-12 encoder works in all radios and fits in virtually all handhelds and mobiles. The ID-1201 decodes any MDC-1200 ANI signal, has a large LED display, a printer port and an RS232 port.

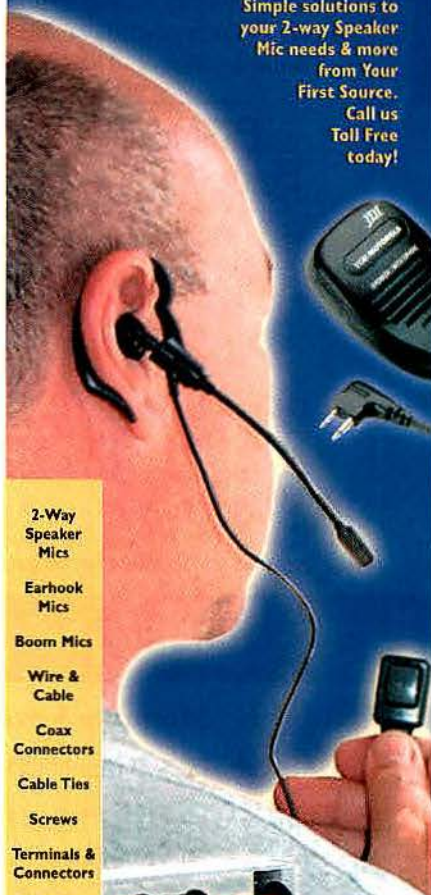
MDC-1200 is a registered trademark of Motorola Inc.

800-521-2203 • 303-989-8000 • Fax 303-989-8003 • [www.ControlSignal.com](http://www.ControlSignal.com)

Circle 38 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)

# Clear and Simple

Simple solutions to your 2-Way Speaker Mic needs & more from Your First Source. Call us Toll Free today!



2-Way Speaker Mics  
Earhook Mics  
Boom Mics  
Wire & Cable  
Coax Connectors  
Cable Ties  
Screws  
Terminals & Connectors  
Switches  
Installation Tools  
Inverters & Power Supplies  
Test Equipment

**DLC DAVID LEVY COMPANY, INC.**

ELECTRONIC PARTS AND ACCESSORIES  
12753 Moore Street • Cerritos, CA 90703 • U.S.A.

NATIONWIDE/CANADA (800) 421-3536

ORDER FAX (800) 421-3538

LOCAL (562) 404-9998

FAX (562) 404-9698

E-MAIL [sales@dlcparts.com](mailto:sales@dlcparts.com)

DLC WEBSITE [www.dlcparts.com](http://www.dlcparts.com)

Circle 34 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)



## PRODUCTS

### Project 25 marches on

Motorola Inc. announced a new generation digital mobile radio expanding its portfolio of Project 25 compliant trunked communications solutions. The new high-end mobile radio delivers a wide variety of user features ranging from dual band operation to data communications capability and is part of Motorola's extensive portfolio of integrated communications and information

solutions to address mission-critical safety and security requirements worldwide. This new two-way mobile radio is scheduled to be available for shipment in the first quarter of 2003.

Designed to support both 800 MHz and the new 700 MHz public safety frequency bands, this next generation digital mobile will have the ability to provide greater communications flexibility for users to move from 800 MHz systems to 700

MHz systems in the future. The radio's initial release will feature existing control head designs from the ASTRO Spectra mobile radio series, so users can transition to the new platform without retraining.

Additional features of this next generation digital mobile include increased memory, encryption capability, dual control head functionality, 512-channel operation and integrated voice and data network capability.

Future additions being planned for this new mobile platform include models for motorcycle applications and support future control head designs for greater upgrade flexibility.

This next generation digital mobile radio platform supports both Motorola's 3600 ASTRO® trunking and 9600 ASTRO® 25 trunking, as well as Project 25 conventional communications systems. Designed to meet the reliability and performance specifications of the ASTRO® Digital Spectra mobile radio series, the new radios will also accommodate select ASTRO Digital Spectra accessories.

<http://www.motorola.com>

### 800 Trunk Console Radio Backup Combiner/Multicoupler

806-869 MHz  
8 Radio Ports  
1 Rack Unit  
Field Swappable Amplifier  
Cooling Fans  
AC and DC Power  
3 dB of Multicoupler Gain  
1 Bi-directional Connection Per Radio  
60 dB of Tx to Tx Isolation  
1 Tx Ant Port  
1 Rx Ant Port  
972.389.0595  
[www.dbSpectra.com](http://www.dbSpectra.com)

Circle 35 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)

## Pagers, parts, and more



### Motorola Keynote pagers:

- ☒ \$99 Monitor Only
- ☒ \$120 2-tone page only
- ☒ \$170 2-tone page & Monitor
- ☒ On freq with 90 day warranty

### Monitor board

- ☒ Installed in a Keynote \$50
- ☒ Installed in a Director II \$60
- ☒ Board only \$40 each (Min 10 boards)

### Minitor II scan board

- ☒ Installed \$50 each
- ☒ Do it yourself kit \$40 each

### Minitor III pagers \$299

- ☒ Add \$40 for Stored Voice
- ☒ Add \$60 for 2 channel
- ☒ Add \$38 for 5 year warranty
- ☒ Add \$99 for amp charger (in place of std)
- ☒ These are brand new units
- ☒ One year factory warranty

Authorized Dealer pricing shown  
others slightly higher

Motorola, Minitor, Director & Keynote are reg. trademark of Motorola Inc.



### Tone filters/reeds

- ☒ Minitor I \$20 each
- ☒ Minitor II \$25 each
- ☒ In stock reeds/filters only

### Programmer interface \$115

- ☒ Replaces Motorola #NLN3548B

**800-822-2180**

Fax: 561-683-0059

1300 N FL Mango Rd #21  
West Palm Beach, FL 33409

<http://www.pwservice.com>



Circle 36 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)

## Receive Weather Alerts Automatically

on your 2-way radio system,  
PA system, voice-mail,  
numeric pager or telephone!

- Rack-mount and mobile systems
- Warnings digitally recorded for DTMF access and playback
- Designed specially for demanding Public Safety use

Call toll free 1-888-877-8022  
or visit our Web site at:  
<http://www.thuneagle.com>



U.S. Patents 5,444,433 - 5,574,999 - D,377,795

Circle 37 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)



Company	Page Number	Fast Fact Number	Advertiser Hotline	Company	Page Number	Fast Fact Number	Advertiser Hotline
AC/DC Industries .....	69	100	281-933-0909	IWCE 2003 .....	72		800-927-5007
The Antenna Specialists .....	25	20	440-349-8400	Kenwood Communications .....	13	9	800-950-5005
an Allen Telecom Company				Klein Electronics .....	68	106	760-781-3232
Astron Corp. .... IBC	2		949-458-7277	M/A-COM Wireless Systems ..	1	4	434-385-2571
Avtec, Inc. .... 19	11		803-892-2181	Metawave .....	38-39	19	888-METAWAVE
Berkeley Varitronics .....	11	8	732-548-3737	Microwave Data Systems ....	22	13	582-242-9600
Centurion Wireless .....	32-33	18	303-635-2000	Mikom US .....	56	28	919-771-2570
David Clark Company .....	21	12	508-751-5800	Narda/L3 Communications ..	43	22	631-231-1700
Comms. Specialists .....	BC	3	800-854-0547	Norcomm Corp. .... 44	23		800-874-8663
Control Signal Corp. ....	63	38	800-521-2203	Paging & Wireless			
CPI Communications .....	47	25	972-429-7160	Service Center .....	64	36	561-638-0022
Crescend Technologies .....	47	26	800-872-6233	Pryme Radio .....	42	21	714-257-0300
Datron World Comm. ....	27	15	760-597-3814	RCC Consultants, Inc. ....	58	30	732-404-2500
DB Spectra .....	64	35	972-389-0595	Simulcast Solutions .....	67	108	716-223-4927
DLC .....	63	34	562-404-9998	Sinclair Technologies .....	51	27	800-288-2763
Duracomm Corp. .... 61	32		816-472-5544	SoftWright .....	71	103	303-344-5486
El Paso Communications .....	66	101	915-533-5119	Southwest Windpower .....	61	33	520-779-9463
El Paso Communications .....	71	109	915-533-5119	Survey Technologies .....	70	105	503-848-8500
Eventide, Inc. .... 17	10		201-641-1200	Tait .....	59	31	800-890-8248
Federal Signal .....	31	17	708-534-3400	Telewave Inc. .... 3	5		650-968-4400
Futurecom .....	45	24	905-860-5546	Thunder Eagle .....	64	37	703-242-0122
General Dynamics				Valmont Communications .....	5	6	888-880-9191
Decision Systems .....	23	14	877-449-0600	Vertex Standard .....	IFC	1	310-404-2700
ICOM America .....	7	7	206-450-6041	Zetron Inc. .... 57	29		425-820-6363
I-Tech .....	29	16	619-458-1500				

## CLASSIFIEDS

### GE PORTABLE SERVICE

- FAST TURN
- WARRANTY
- \$48.00 hr./2 hr. MAX
- PARTS GE LIST
- RETURN UPS PAID



#### Smith Communications Service

2121 W. Parrish Ave., Owensboro, KY 42301

270-683-0936



To Advertise in  
MRT Classifieds, call

*John Piotrowski*

800-347-9375

**Computer Software ..... 71**  
**Employment ..... 66**  
**Equipment For Sale ..... 66**  
**Professional Services..... 65**  
**Rentals and Repairs ..... 70**  
**Tower Services ..... 66**



**SCHWANINGER & ASSOCIATES**  
Attorneys at Law

**Robert H. Schwaninger, Jr.**  
1331 H Street N.W. Suite 500  
Washington, DC 20005  
Ph. 202-347-8580  
Fax 202-347-8607

### PORTA-TECH

**PORTABLE  
TECHNICAL  
SERVICE, INC**

493 Crowell Lane • Lynchburg, VA 24502

FACTORY TRAINED  
TECHNICIANS FOR  
QUALITY SERVICE

GE Portable Radio Service Depot

Factory Approved Nationwide

- Current Product Lines
- Voice Guard Certified
- Public Service Trunking
- Surface Mount Technology

**ERICSSON**

(434) 239-3049

### MCCON

**Mobile Communications Consulting**  
S.R. McConoughey, P.E.  
Principal

13017 Chestnut Oak Drive  
Gaithersburg, MD 20878 (301) 926-2837



"Strongest Voice in the Forest"

**David E. Laag, P.E.**  
**Communications Engineering Consultant**

PO Box 51807 Riverside, CA 92517  
www.pac-comm.com  
e-mail: dlaag@pac-comm.com  
Voice: 909-601-2002 • Fax: 909-924-1518

### FREDERICK G. GRIFFIN, P.C.



2938 Waterlick Road  
Lynchburg, VA 24502  
(434) 237-2044

**NATIONWIDE COMMUNICATIONS CONSULTING**  
Mobile Radio, Microwave, E9-1-1,  
CAD, Paging, LAN,  
Dispatch Communications Centers  
Multi Site Propagation Analysis

**TROTT**  
COMMUNICATIONS GROUP

**RAYMOND C. TROTT, P.E.**  
Chairman

1425 Greenway Drive, Suite 350  
Irving, Texas 75038  
972/580-1911 • Fax: 972/580-0641



DIGITAL LAND MOBILE RADIO CAREERS  
- New Zealand



## Technology's improving our way of life... ...discover it first-hand.

As New Zealand's largest electronics company, putting your technical talents to work here will open the door to an unbeatable lifestyle in one of the world's most desired locations. Fixed term contracts are currently available for professionals with APCO Project 25 technical experience relevant to the following positions:

- Design Manager
- Senior Design Engineer
- Product Design Tester
- System Trainer
- System Installer

Assistance with relocation and work visas will be available as well as the opportunity to contribute to a dynamic team culture that is Tait Electronics Ltd. On top of the obvious technical career benefits, you can look forward to a truly enjoyable way of life. Whether it's cafes, alpine pursuits, salmon fishing or simply the wide-open spaces that suit - they are all at your fingertips.

**TAIT**  
Radio Communications

*So if you are ready to let your talents truly improve your lifestyle, please contact Barry McAlpine on 011 64 3 358 0373 e-mail: [tait.jobs@tait.co.nz](mailto:tait.jobs@tait.co.nz) or visit [www.taitworld.com](http://www.taitworld.com) for a full list of our exciting project vacancies.*

[www.taitworld.com](http://www.taitworld.com)

## SR. COMMUNICATIONS SERVICE ENGINEER ST. LOUIS METROPOLITAN POLICE DEPT.

**W**e have an immediate opening for a Sr. Communications Service Engineer. The primary responsibilities of this position are to install, maintain and repair communication, fixed-end radio and telecommunications equipment. Evaluate diagnostic reports regarding the trunked radio system, phone system network, voicemail system, micro wave link, and the communications infrastructure network and take any appropriate action. Install, maintain and repair fiber optic cable and associated electronics.

Qualifications include Bachelors Degree in Electronics, Electrical Engineering or equivalent experience. Advanced working knowledge of electronics, computer networking and radio frequency propagation. A minimum of 5 years experience in electronics or equivalent with at least 3 years in radio frequency trunking, or at least 3 years as a Service Engineer. Licenses/Certifications required: Federal Communications Commission General Radio/Telephone Operator License or Personal Communication Industry Association Certification, Microsoft Certified Systems Engineer Certification.

The successful candidate must become a resident of the City of St. Louis within 90 days of hire. If interested, please mail, email or FAX (FAX or email preferred) a resume **with salary history** to:

Human Resources Dept. RE: Communications Service Engineer  
St. Louis Metropolitan Police Dept.  
1200 Clark Ave • St. Louis, MO. 63103  
FAX (314) 444-5493 • Email: [Lmcontestable@slmpd.org](mailto:Lmcontestable@slmpd.org)  
EOE - M/F/D/V

For faster service visit  
[freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)

## Transcendent

CTCSS ENCODERS/ DECODERS  
SINGLE TONE/ MULTI TONE ENCODERS/ DECODERS  
INCLUDING STATION ID AND TIME-OUT TIMER  
MINIATURE SIZE AND LOW POWER

[WWW.TRANSCENDENT.COM](http://WWW.TRANSCENDENT.COM)  
(973)-209-1498 SALES@TRANSCENDENT.COM

## METRO BOSTON

Waltham, Ma. 42-23-20 71-15-13  
AGL: 302' AMSL: 720' HAAT: 570'

### DISPATCH COMMUNICATIONS

(603)421-0015 • More info & sites:  
[www.dispatchcomm.com](http://www.dispatchcomm.com)

## TWO WAY RADIOS & ACCESSORIES BASE ANTENNAS

### MOBILE ANTENNAS

### PORTABLE & GPS ANTENNAS

### COAX CABLE & CONNECTORS

### RECHARGABLE BATTERIES

### RF AMPLIFIERS

### REPEATER & INTERFACES

### ENCODERS & DECODERS

### LIGHTNING PROTECTORS

### DUPLEXERS

### TOWER SECTIONS

### POWER SUPPLIES

### PROGRAMMERS

### SOLAR MODULES

### DEACTIVATORS

### DC/DC CONVERTERS

### RF TEST EQUIPMENT



Immediate  
Delivery,  
Warranty  
& Service

*High Quality at Affordable Prices..!!*

**EPCOM**

MIAMI, FL.  
7262 NW 54 St  
3055 888-1127 FAX 305-888-0652  
MIAMI, FL. 33160 U.S.A.  
E-mail: [epcom@earthlink.net](mailto:epcom@earthlink.net)

Ask for your  
free Catalog

EL PASO, TX  
1630 PAYSANO DR  
(915) 533-5110 FAX 915-542-4701  
EL PASO, TX 79901 U.S.A.  
[www.epcom.net](http://www.epcom.net) [epcom@elc.net](mailto:epcom@elc.net)

CIRCLE 101 ON FAST FACT CARD

## Equipment for Sale

### Service Monitor Sale

HP8920B	\$3000
Opt.001;004;006;013;014;031;051;102	
HP8920B	\$3500
Opt.001;004;006;013;014;031;051;102;800	
Motorola R2600	\$2900
Motorola R2009D	\$2500
Motorola R2001D/HS	\$2750
Motorola R2200A/HS	\$1900

Refurbished, 5 Day ROR • Prices do not include S&H  
Advanced Communications & Electronics, Inc.  
434-237-8255

[sales@advcommunicationsinc.com](mailto:sales@advcommunicationsinc.com)  
[www.advcommunicationsinc.com](http://www.advcommunicationsinc.com)

## Tower Services



### BUYING ERICSSON - GE EQUIPMENT

LPE-200 800 EDAC From	650
PCS/MPA/LPE/KPC rapid multi-Chgr	295
MPA/MPID std. desk charger	25
Monogram port. 36-42 new	100
11,000 Items new GE parts	Call
VHF/UHF/800 Voting aux rec	250
S825 Scan head w/warranty	200
S990 128 ch head w/warranty	125
S950 128 ch head w/warranty	75
S550 Scan control head mint	195
Phoenix-SX 16CH VHF W/acc.	150
MLSH040/041- VHF MLS w/acc.	150
MLS 440-470 w/acc.	250
MLS 30-42/42-50 w/acc.	250
MLS-II 403-430 or 150-174 new	50
radios less acc. & control pnl	
MVS VHF & UHF w/acc.	250
KPC300 Encsson VHF & UHF Port.	225
PCS UHF 2 CH Tech. specials	40
Rangr 150-174 110w less acc.	325
Rangr 30-42/35-50 100w less acc.	325
Rangr 440-470 100w less acc.	325
Delta-SX 450-470 less acc. 100w	250
Delta-SX 150-174 less acc. 100w	250
MASTR II 150-174 110w less acc.	125
MASTR II 42-50 110W	125

**NEW LONDON TECHNOLOGY**  
752 Alum Springs Road • Forest, VA 24551  
Tel: 434-525-0068 • Fax: 434-525-0078  
www.newlondontech.com

### BUY • SELL • TRADE • CLEAN EQUIPMENT

OVERSTOCKED! Must sell NOW -- Make an Offer.  
See our website for 100s more items. • barnettelec.com • email bob@flash.net  
Min order \$200 + shipping • VISA/MC, NO COD'S

**Make Your Own Super Deal with Bob!**

50 MICOR C73RTB1106E VHF 100W BASE/REPT	SALE \$300
1 DESKTRAC BASE 100W 42-50 LNEW TONE	CALL
30 155 WATT 800 MHZ PA DBP155CM2A-G WIDE BAND SOLD STATE	FROM \$500
40 SMARTNET TRUNKED SYSTEM CONTROLLER T5076 & others	FROM \$1000
200 MICOR C55RCB5103 AT 800 MHZ REPEATERS 35,75 & 150 WATT	FROM \$250
15 TPL 260 WATT PA B-266 HMS W/PS	SALE \$350
50 SYNTOR X CONSOLE & BASE 800T	SALE CALL
3 MSF 5000 UHF C74CLB 110W REPT	SALE CALL
30 GE 900 MHz DIGITAL PAGING OR CONV REPT 60w	SALE CALL
20 MICOR VHF-UHF 30-50 MHZ BASE/REPT 100-375W	CALL
25 GE MASTR II BASE/REPT 30-50 MHZ VHF, UHF	CALL
40 CELWAVE SJD 880-5T, W/5CH MULTICOUPLER	SALE \$500
50 SPECTRATAC RECEIVER, VOTER NEW	SALE CALL
6 SPECTRATAC COMPARATOR TRN1786	CALL
30 STX 800 TYPE I & II, PORTABLES	FROM \$100
200 EXPO VHF PORTABLES W/CHARGER	FROM \$25
30 SABER-I UHF PORTABLE W/ CONVERTACOM	CALL
200 MICOR VHF 100W 12CH W/ACC	4 / \$200 - 25/1000
100 SYNTOR X VHF 100W 32CH W/ACC	FROM \$100
100 DELTA S VHF 100W 16/32 CH W/ACC	FROM \$50
200 MASTR E VHF 12 CH 100W W/ACC	FROM \$50 - 25/\$1000
4 MSL-260 60W 2 CH 42-50 MHZ	\$295 - 4/\$1000
10 RANGER VHF 110w W/ACC	FROM \$295 - 10/\$2500
10 DELTA SX VHF 110W W/ACC	FROM \$250 - 10/\$2000
100 SYNTORX 9000 CABLES USED HKW4221A	10/\$500
50 MITREK 60-100W 30-39 MHz / VHF150	FROM \$100
10 MIDLAND 70-050 42-50 MHz 60 W	FROM \$100
2 MIDLAND SR 70-2950 VHF 80 W W/PAC REPT	\$495
500 SYNTOR X 9000 800 TRUNKED TYPE I/II & CONV.	SALE \$150ea
20 SYNTOR X 9000 UHF 32 CH W/ACC	SALE 4 / \$1000
400MOT PAC-RT REPT UHF/VHF	SALE FROM \$150
30 SYNTOR X 800 CONVENTIONAL 35W	SALE \$50
10 SPECTRA 900 B7 15W	SALE \$100
20 SYNTOR X 9000 CONVENTIONAL 35W 800 MHz SALE	FROM \$100
25 CENTRACOM II SYSTEMS, CARDS, PARTS & CABINETS	
SALE 50% OFF	
100 T-1600 TONE 4 CH REMOTES	SALE FROM \$100
100 T-1383 TONE2 CH TEL REMOTES	SALE FROM \$50

**BARNETT ELECTRONICS INC**  
330 HWY, 236 Lonoke, AR 72086 • Phone: 800-423-3858  
FAX: 501-676-2475 • Info: 501-676-5506 • Hrs 8-5 M-F CDT

## Talkout Problems?

### Need to Simulcast?



- Accurate GPS frequency sources
- Audio delay / equalization
- Voter comparators

**We provide the tools:  
You satisfy your customer.**

# Simulcast SOLUTIONS


585.223.4927

www.simulcastsolutions.com

CIRCLE 108 ON FAST FACT CARD

### Zetron Model 49's with GE 450 MHz Mastr II 100 watt Repeaters \$1,500 each

- 1- Hark SS-450, Interconnect Steering Switch
- 1- WP-994-10, 800 Meg Wacom Combiner (New)
- 2- DC76RAU66A, VHF 100 Watt Base Station



**PARKINSON ELECTRONICS COMPANY**  
806-894-1576

\*ask for Melvin

### WE BUY AND SELL USED MOTOROLA TWO-WAY RADIOS

**SCHAEFER RADIO CO.**  
130 West Fayette St.,  
P.O. Box 395  
Denver, IA 50622

**PHONE:**  
(319) 984-6115

**FAX:**  
(319) 984-6220

**WANTED: GP300 Portables, VHF/UHF SPECTRA Mobiles and UHF SYNTOR Mobiles**

**QTY**

8 ea. MICOR PURC BASES, 900 MHz, C75JB21101A	
1 ea. MICOR RPTRS, 800 MHz, C55RCB5103AT	
1 ea. TXRX 5 CHANNEL COMBINER, 800 MHz	
2 ea. GTX 800 MHz, LTR M11UG06CU1AN	
7 ea. MAXTRAC, 800 MHz, D35M0A5G5B4K	
30 ea. RADIUS P200,490 MHz, H44RFU7120BN	
1 ea. MSF 5000 RPT, 460 MHz, C74CXB7106BT	
8 ea. GR1225 RPTRS, 460 MHz, H5157A	
7 ea. MICOR RPTRS, 460 MHz, C64RCB3105	
14 ea. SINCLAIR DUPLXERS, 460 MHz, C3034-2F	
90 ea. SYNTOR X 9000, ACCESSORY GROUPS	
9 ea. MITREK 460 MHz, T64JA3900DK	
6 ea. MAXTRAC, 460 MHz, D44MJATJASAK	
99 ea. RADIUS GM300, 460 MHz, M34GMC29C3AA	
6 ea. RADIUS M100, 460 MHz, D34LRA73A5BK	
7 ea. MAXTRAC, 460 MHz, D34MJATJASAK	
2 ea. MT1000, 460 MHz, H44GCU7100BN	
42 ea. HT600, 460 MHz, H44SVU7160	
18 ea. HT600, 460 MHz, H34SVU7160BN	
4 ea. GP300, 460 MHz, P94YPC28A2AA	
1 ea. MICOR BASE, 155 MHz, C73RTB1106E	
99 ea. SYNTOR X 9000,155 MHz, T73KEJ704AK	
16 ea. MARATAC, 155 MHz, T73XTA70A3AK	
11 ea. MITREK, 155 MHz, T83JA3000	
6 ea. SYNTORX, 43 MHz, T71VB7204AK	
13 ea. MARATAC, 48 MHz, T81XTA7DA3AK	
11 ea. MAXTRAC, 43 MHz, D51MJA9734AK	
14 ea. MT1000, 43 MHz, H41GCU7160AN	
99 ea. MITREK, 48 MHz, T81JA4000	
10 ea. MICOR BASE, 37 MHz, C71RTB1406	
22 ea. MARATAC, 37MHz, T81XTA7A5BK	
99 ea. MITREK 35 MHz, T81JA4900DK	
5 ea. DC DESK SETS, T1376	
22 ea. LOCAL DESK SETS, T1370	

### Test Equipment - We Buy & Sell

Most Equipment Includes :180 Day Warr. & NIST Calibration

HP8920A/102,03,04,05,56500.	HP8920A/01,03,04,05 - \$4500.
HP8921A - \$6500.	HP8921A/600-COMA-56900.
HP 88285A/102 COMA-59900.00	HP83204A (IS136-TDMA)-\$2500
HP8920B/101/4 - 56,900	HP8920B/01,04,06,13,14 - \$4900
HP8920B/01,04,06,13,14,50,102-56500	HP83206A (IS 136 TDMA) \$800
HP8920B/01,04,06,13,14,51,102,800 (IS 136 TDMA)-\$7500.00	
HP8922M-55900.	HP8922S GSM-53900.
HP8922P(GSM/PCS)-56,900.	HP8924E(CDMA)-57900.
HP8924C (CDMA)-59900.	HP8326B(PCS)-\$1500.
IFR 1600S-55900.	IFR500A-53500.
Motrola R2001D-\$4500.	Motrola R2600C/WL-55500.
Motrola R2600C-55900.	Motrola R1151A-5500
Wavetek 3600D,IS 136TDMA,FECAELPPCS-900	
Wavetek 3600D-COMA-58,500.	Anritsu Sitemaster S331C-\$5500
Spectrum Analyzers: HP8594E-56000	Anritsu S332C-56050
1000MHz Sig.Generators: Huke 6061A-S1600, Marconi 2022E-S1800.	
HP8657A-S1800, HP8647A- S1800	
2000MHz Sig. Generators HP8657B-100kHz-2.1 GHz-52900.	
HP5334B (1.3GHz counter) -5375.	HP8903B Audio Analyzer-S1800.
TIAS Sets: HP4935A-S950.; HP4934A-S1250.; HP8901B-S750	

**New Anritsu Sitemasters on Sale I- CALL!**  
**Amtronix Instruments, Inc**  
www.amtronix.com  
Ph: 716-763-9104; Fax: 716-763-0371

### Great for: Trade Shows • Sales Aids • Media Kits Employee Training • Sales Presentations Conference Material • Educational Programs

# article REPRINTS



**FosteReprints**  
866-879-9144

4295 S. Ohio Street, Michigan City, IN 46360 www.fostereprints.com



## IDEN / NEXTEL Gear with Functional PTT Button! PTT controls both the 2-way radio and Cellular functions!

### Heavy Duty, High-Noise Headset!

#### TITAN



- Noise canceling dynamic mic with 24 dB NRR.
- Switchcraft connectors for quick release and in-field swap.
- PTT on Earshell - great for those wearing gloves.



Available for Eagle & Condor Series

These cables are also available for David Clark Headsets!  
Cables also available for 2-way radios!

### Motorcycle Helmet Headsets!



K06

- Available for Open and Closed Faced Helmets.
- PTT answers in-coming phone calls and controls 2-way radio Direct Connect!
- Weatherproof PTT button secures to handlebars.
- Noise canceling microphone & durable quick release cables.



K015

**NEXTEL**  
IDEN / MIKE / SouthernLINC

**Klein**  
electronics

"The Leader in Audio Accessories"

800-959-2899

760-781-3220

[www.HeadsetUSA.com](http://www.HeadsetUSA.com)

IDEN is the trademark property of Motorola  
NEXTEL logo is the trademark property of NEXTEL COMMUNICATIONS, Inc.

CIRCLE 106 ON FAST FACT CARD

All CCII  
Labels

WHITE, ORANGE, GREEN AND RED  
BUTTONS AVAILABLE

**\$12.50 ea**

CCII PROGRAMING AVAILABLE

ORDERS SHIPPED IN 14 DAYS

**NORTHEASTERN**  
Communications, Inc.

Waterbury, CT (203) 575-9008

For faster service visit  
[freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)

### RCA TACTEC

used radios .....	B/O
Large quantities: TAC-100, 200, 300, 310 .....	
12 EF JOHNSON CR-1000, 1010, UHF repeaters .....	\$500/\$750
30 EF JOHNSON Fleetcom II UHF mobiles .....	\$65 ea.
2 EF JOHNSON Prom Programmer II .....	\$450 ea.
25 MIDLAND XTR mobiles 70-1530B, 1695B .....	\$250/\$375
8 GE Delta-S UHF 100W 450-470 mobiles .....	\$275 ea.
10 STANDARD GX-3000 TJ 800 MHz mobiles .....	\$75 ea.
14 STANDARD C768L UHF mobiles .....	\$50 ea.
20 KENWOOD TK-801 UHF mobiles .....	\$125ea.
3 TEKTRONIX oscilloscopes 465B/2235A .....	\$750/\$1400
1 MARCONI 2955 service monitor .....	\$4700
1 CUSHMAN CE-6030A service monitor .....	\$3500
2 HEWLETT PACKARD 5386A freq. counters .....	\$2500
5 TELEWAVE Rx dist. panels TWR-8-150 & 24-860 ...	\$450/\$675
DISPATCH COMMUNICATIONS	
(603)421-0015 ext 111 • <a href="http://www.dispatchcomm.com">www.dispatchcomm.com</a>	

**COMPLETE CHANNEL ELEMENTS**  
**YOUR FREQUENCY**  
**LIFETIME GUARANTEE**  
**Most Elements \$20.00 with Trade**

Crystals  
We Buy Used Elements

**NKX**

1814 Hancock St.  
Gretna, LA 70053

504-361-5525 (in LA) • 800-237-6519  
FAX 504-361-5526

• BOARDS • STRIPS • ACCESSORIES • ELEMENTS • REEDS •		• BUY • SELL • TRADE •
<b>PCI — PEKAAR COMMUNICATION INC.</b>		
\$ Specials of the month \$ Steve's back, formerly of Gregory Electronics Corp.		
GE MLS mobile model MSL260 42-50 range w/ access .....	\$150	
GE PCS multi unit charges model 344A3072PB .....	\$50	
GE Rangers 40 Watt high band 150-170 range less access .....	\$35	
GE ranger rack mount base station model 19A70467P1 less cabinet .....	\$250	
GE MDS mobiles high band with access. Model TLH22 .....	\$80	
GE MLS mobiles high band, with mic & bracket .....	\$165	
GE MLS UHF mobiles with mic and bracket .....	\$155	
GE S550 Scan control head .....	\$98	
GE PHOENIX Mobile beige .....	\$65	
GE PCS portable 150-170 range .....	\$99	
Motorola portables HT 600 two freq. .....	\$125	
REGENCY Mobile model BTH201 high band .....	\$20	
MOTOROLA Micor 150-170 range. 100W range less accessories .....	\$50	
Catalog Available...If you can't find it, try us! Call (973) 772-0704 or fax (973) 340-1902		
• REEDS • ELEMENTS • ACCESSORIES • STRIPS • BOARDS		



**NATIONAL DISTRIBUTION CENTER**5520 North 1<sup>st</sup> street Abilene, Texas 79603

International Sales • Internet Specials

[www.ndcsales.com](http://www.ndcsales.com)**1-800-599-7235****USED 800 MHz EQUIPMENT 4 SALE****BUILDING OUT YOUR SYSTEM OVERSEAS?**

WE STOCK IT ALL. USED CONTROLLERS, REPEATERS, RACKS, COMBINERS, POWER SUPPLIES, POWER AMPS, MULTICOUPLERS, PANEL ANTENNAS, SPARE BOARDS, MODEMS, SERVICE PARTS, ACCESSORIES, MOBILE ANTENNAS, MOUNT KITS AND MORE!

**CHECK OUT THESE EXAMPLES**

Motorola controllers in stock T1921A, T1958A, T3040A, T4052A	
T5004A/Privacy Plus Super Enhanced Controller, 21 channel .....	\$15,000.00
MBX/Motorola Business Exchange, telephone interface .....	\$7,500.00
C65CLB-5103/MSF5000 75 watt repeater .....	\$2,500.00
C55RCB-5103/Micor 75 watt repeater	
- Reg. \$500.00 ea.	Buy one at regular price get one free
E.F. Johnson CR8000/800 MHz complete repeater in cabinet .....	\$500.00
MRS804ZX/800 MHz repeater with 90 watt PA .....	\$1,450.00
MRS804A/S/T/800 MHz standard trunking repeater .....	\$500.00
TKR900/800 MHz repeater with 90 watt PA .....	\$1,500.00
M-500/Trident smart buffer .....	\$250.00
RVL5200/Trident site controller .....	\$720.00
M101-860/5 channel combiner .....	\$500.00
ACT2705/Antenna Specialists 5 channel combiner .....	\$1,600.00
TX/RX T-Pass Cavity Combiner, 5 Channel .....	\$2,500.00
TWR-860/Telewave receive multicoupler .....	\$250.00

**1000's of NEW PARTS AND ACCESSORIES IN STOCK!**

- ✓ **INVENTORY SPECIALS**
- ✓ **QUANTITY DISCOUNTS**
- ✓ **PAY BY CREDIT CARD!**
- ✓ **FREE QUOTES**

U.S.A. CUSTOMERS MAY FAX TO: 1-800-599-7252  
INTERNATIONAL CUSTOMERS CALL US AT 915-698-2481  
OR FAX TO: 915-690-1309

**Delay Timer****"ON WHEN IGNITION IS OFF"**

- Battery & Equipment Protection Device
- Low/High Voltage load shut down
- Allows retrieval of data for MDT, GPS, AVL
- 30 AMP 12 Volt DC
- Low voltage sensor (10.5V) - Over voltage protection (17V)
- One year warranty.

**WIG-WAG HEADLIGHT FLASHER 100% SOLID STATE**

- Power: 12 volts, negative ground system
- Up to 4 different patterns
- Flash rate: Nominal 1.9 per second on wigwag pattern
- Lamp Wattage Capacity: 180 watts
- Current Output: 15 Amps
- Size: L 4" x W 2" 1/8" x H 1 1/2" ~ Wt 3 1/2 oz.
- For all US made vehicles

**AC/DC INDUSTRIES**

P. O. BOX 710548, HOUSTON, TEXAS 77271

Tel: (281) 933-0909 • Fax: (281) 933-1001

Toll Free: 800-888-0909

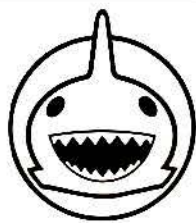
Web-Site: [www.acdcind.com](http://www.acdcind.com)E-mail: [sales@acdcind.com](mailto:sales@acdcind.com)

CIRCLE 100 ON FAST FACT CARD

**CMC ENTERPRISES 2-WAY, MICROWAVE & TELECOM EQPT.**

Quantity	Equipment List	Price
<b>ALL TOWERS ARE ON THE GROUND READY FOR P/U-OTHER SITES AVAIL.</b>		
30	MOTOROLA DARCUM RADIOS	\$250 EA ★
20	MOTOROLA MARATHAC LO BAND 110W 42-50 MHz AT ACC	\$275 EA★
1	320P SPDR ANDREW LOF-6-50 UNUSED	\$0.000★
1	PYRDD 345' OLIVED TOWER 46" FACE VERY GOOD COND	\$11,000★
40	MICROWAVE DISHES 4.6, 10/11 GHZ	\$ CALLS★
50	MOTOROLA STARPLUS CHANNEL MODEMS MLN 6625	\$225 EA
50	MOTOROLA STARPLUS CHANNEL MODEMS (TX) ORN4535A	\$125 EA
50	MOTOROLA STARPLUS CHANNEL MODEMS (RX) ORN4535A	\$125 EA
60	MOTOROLA SIMULCAST REMOTE DELAY MODULES TRN9964A	\$175 EA
15	MOTOROLA SIMULCAST CONTROLLER INTERFACE MODULES	\$CALLS
LOTS OF MOTOROLA, GRANGER, LENKURT MULTIPLEX		
25	GE DELTA SX UHF 110W	\$225 EA
15	GE GRANGER LOW BAND 110W	\$275 EA
15	GE GRANGER UHF 110W	\$275 EA
1	GRASIS M 46 340' TOWER	\$5,500
1	ADVANCE INDUSTRIES 48" FACE 330' TOWER	\$5,000
1	ADVANCE INDUSTRIES 48" FACE 360' TOWER	\$5,500
5	HARRIS FARINON OM 2-4 A-12 2.1-2.3 GHZ B T 1 (PER TERM)	\$2,000EA
1000+	ANDREW HELIX HANGERS, GROUND STRAPS, 7/16 DIM TO MAIL N ADAPTORS, HOISTING GRIPS FOR 7/8 AND 1 5/8 HELIX	\$CALLS

★New Listing★ Call Charles at 336-769-2885  
For more equipment, visit our website at [www.cmcnet.com](http://www.cmcnet.com)

**DANGER**

If you aren't advertising in **MRT Classifieds**  
you are swimming in dangerous waters!

Call **1-800-347-9375** to place your ad today!



## SAFETY:



## THE EARLY ELIMINATION OF DANGEROUS POSSIBILITIES

**In a world of risk**, all the training and equipment in the world won't make up for a break in mobile communications.

STI provides the system you need to automate radio signal measurements and analyze the results with contour plots and measurement summaries. You get concise reports identifying weak spots in signal coverage, so you can address problem areas before unreliability becomes a liability.

The key to safety is planning. Make sure your team has the critical communication coverage it needs to succeed.



**STI** Survey Technologies Incorporated

"Geographic Signal Coverage At Your Fingertips."

877-848-8500 toll-free  
local: 503-848-8500 fax: 503-848-8534

www.surveystech.com  
marketing@surveystech.com

8085 S.W. Nimbus Avenue • Beaverton, OR 97008

CIRCLE 106 ON FAST FACT CARD

## Rentals and Repair

### Classified Advertising Works!



### MOTOROLA RADIO RENTALS

Ten years of great service to you!

Call for a quote.  
We'll make your next project affordable.

*Jason Moss*

www.mosscom.com  
800-822-MOSS



### MOTOROLA PORTABLE & MOBILE REPAIR

- Quick Turn Around
- FCC Licensed Techs
- Factory Trained Techs
- 90 Day Warranty on all Repairs



10117 W Oakland Park Blvd. Suite 321 Sunnyside, FL 33351  
800-567-5636  
www.arcom2way.com

### MOTOROLA RADIO RENTALS

- HT1000, GP300, P200
- Intrinsically Safe
- Full Line of Radio Accessories
- Mobiles & Repeaters
- 24-Hour Service
- Dealer Inquiries Invited

1-800-283-COMM  
EVENT RENTAL COMM., INC.  
e-mail: eventcomm@aol.com



Minitor II Pager  
Repair Just \$37.50  
Price includes all  
Parts and Labor

5 Day turn time  
90 Day Warranty

Dealer Price

800-822-2180

1300 N FL Mango Rd #21  
West Palm Beach, FL 33409

Water/Physical Damage and  
housing parts not included



**PRS \$39** flat rate plus parts

MOTOROLA PORTABLE & MOBILE REPAIR  
FACTORY TRAINED & FCC LICENSED TECHS  
FREE RETURN SHIPPING - QUICK TURN AROUND

**PORTABLE RADIO SERVICE, LLC**  
209 KERA Dr. • Mtn. View, AR 72560  
Voice: 800-245-4310  
Fax: 870-269-5666  
www.portable-radio-service.com





## Cardinal Electronics, Inc.



### SERVICE MONITOR Repair & Calibration

Exclusive Monitor repair since 1973

NIST TRACEABLE

Visit our Website: [www.cardinalelec.com](http://www.cardinalelec.com)

1631 N. Evergreen Ave. Arlington Heights, IL 60004  
Ph. (847) 797-7820 Fax (847) 870-0342

## Loudoun Communications Inc.

Communications Systems

### REPAIR DEPOT

QUALITY SERVICE ON MICROPROCESSOR-BASED

MOBILES, PORTABLES AND CONTROL HEADS.

SURFACE MOUNT REPAIR. MOST REPAIRS \$75 PLUS PARTS.

FREE ESTIMATES.

Warranty Service Available On:

M/A-Corn • Kenwood

585 Factory Shoals Rd.

Austell, GA. 30168

770-948-9566

# Equipment for Sale

# Computer Software

# ICOM®

## BRAND NEW RADIOS

## END OF SUMMER HOT SPECIALS

### Super Deal

(Only for Dealers)

3 YEAR  
WARRANTY



ICF 320-S VHF 4 Ch 45 W 148-174 MHz **\$214.00**

ICF 420-S VHF 4 Ch 35 W 450-473 MHz **\$239.00**

SOPC478PM Programming kit Only **\$29.99**

We stock thousands of portables, repeaters and mobile radios!

## EPCOM

1630 Paisano Dr. EL PASO, TX 79901 USA

(915) 533-5119 Fax (915) 542-4701

[www.epcom.net](http://www.epcom.net) [epcom@whc.net](mailto:epcom@whc.net)

7262 NW, 54th St. MIAMI, FL 33166 USA

(305) 889-1127 Fax (305) 889-0652

Toll Free 888-533-5119

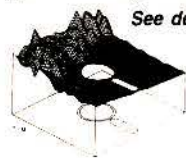
[epcom@whc.net](mailto:epcom@whc.net)

CIRCLE 109 ON FAST FACT CARD

## Find Solutions

To Your RF Coverage  
and Site Management  
Problems . . .  
On your own PC!

For either microwave links or area coverage, our  
Terrain Analysis Package (TAP)™ software helps  
you find system design solutions in-house.



See details and download demo from our web site!

SOFTWRIGHT, LLC

1010 So. JOLIET ST, SUITE 204

AURORA, CO 80012-3150 USA

TEL. (303) 344-5486 • FAX (303) 344-2811

[www.softwright.com](http://www.softwright.com)

e-mail: [sales@softwright.com](mailto:sales@softwright.com)

CIRCLE 103 ON FAST FACT CARD

## SmartZone® SmartNet®

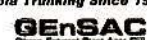


Management Challenges?

- Airtime & Busy Reports • DIU / DBL Reports
- Channel Site / Zone Reports • Billing & Management
- Affiliation Deaffiliation Reports • Consoles & Voice Logging

and that's just the beginning...

Enhancing Motorola Trunking Since 1983...



[www.GenesisWorld.com](http://www.GenesisWorld.com)

1-877-548-0465

CIRCLE 104 ON FAST FACT CARD

**For faster service visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)**



# A Critical Element of Business Effectiveness, Efficiency and Overall Safety is a **Reliable and Powerful** Wireless Communications System



➤ **BASE STATION WORKSHOPS: MARCH 10-11** ➤ **CONFERENCE AND EXHIBITS: MARCH 12-14**  
 ➤ **LAS VEGAS CONVENTION CENTER, LAS VEGAS**

- Completely revamped powerhouse conference program is devoted to the concerns of professionals seeking to improve business efficiency and safety through improved wireless communications technologies.
- Get critical regulatory updates, spectrum management, RF Safety, and business management.
- See products and services of over 350 exhibitors on the show floor including mobile radio, cellular, pagers, mobile data, GPS, ITS, RF equipment, Base Station Equipment, Systems Integration and Satellites.

## DON'T MISS THIS OPPORTUNITY!

➤ **Unsurpassed Keynote Speaker Richard Butler, Influential World Leader in UN Arms Inspection**  
**Open to All Badged Participants! Wednesday, March 12, 9:00am-10:00am**



IWCE 2003 is pleased to offer IWCE participants the opportunity to experience one of the world's most sought after keynote speakers—Richard Butler, Diplomat in Residence at the Council on Foreign Relations, New York. Mr. Butler has been directly involved in the Iraq weapons inspection process and offers a unique and informed perspective on external threats to world stability.

➤ **Discover Practical Ways to Improve Your Business.**  
**Attend IWCE 2003 Professional Education Sessions in the Following Tracks:**

Homeland Security  
 Public Safety  
 Interoperability  
 Business  
 Transportation and Utility Applications  
 Regulatory/Policy  
 Plus, Base station workshops

For a complete list of conference sessions, for more information about IWCE 2003 or to register, go to [www.iwceexpo.com](http://www.iwceexpo.com) or call 1-800-288-8606.

**For information on exhibiting at IWCE 2003, please contact:**

Renie Fuselier  
 Phone: +1-720-489-3137  
 Fax: +1-720-489-3101  
[rfuselier@primediabusiness.com](mailto:rfuselier@primediabusiness.com)

IWCE 2003 is supported by the following publications:

**MRT**

*City & County*

*RF design*

**FIRE CHIEF**

*www.Bulk Transporter*

**Refrigerated Transporter**

**SECURITY SYSTEMS**

**ROCK PRODUCTS**

**Waste Age**

*FleetOwner*

**Transmission & Distribution**

**WARD'S**

**Coal Age**

**SCHOOL & UNIVERSITY**

**Grounds**

**Construction**

**EMJ**

**GOVERNMENT SECURITY**

**TRANSPORTATION SECURITY**

**WWW.IWCEEXPO.COM**

MOBILE RADIO TECHNOLOGY IS THE OFFICIAL PUBLICATION OF IWCE





# ...POWER ON WITH ASTRON

SWITCHING POWER SUPPLIES...

## SPECIAL FEATURES:

- HIGH EFFICIENCY SWITCHING TECHNOLOGY SPECIFICALLY FILTERED FOR USE WITH COMMUNICATIONS EQUIPMENT, FOR ALL FREQUENCIES INCLUDING HF
- HEAVY DUTY DESIGN
- LOW PROFILE, LIGHT WEIGHT PACKAGE
- EMI FILTER
- MEETS FCC CLASS B

## PROTECTION FEATURES:

- CURRENT LIMITING
- OVERVOLTAGE PROTECTION
- FUSE PROTECTION
- OVER TEMPERATURE SHUTDOWN

## SPECIFICATIONS:

INPUT VOLTAGE: 115 VAC 50/60HZ  
OR 220 VAC 50/60HZ  
SWITCH SELECTABLE  
OUTPUT VOLTAGE: 13.8VDC

AVAILABLE WITH THE FOLLOWING APPROVALS: UL, CUL, CE, TUV.



MODEL SS-10TK



MODEL SS-12IF



MODEL SS-18



MODEL SS-25M

## DESKTOP SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-10	7	10	1 1/2 x 6 x 9	3.2
SS-12	10	12	1 1/2 x 6 x 9	3.4
SS-18	15	18	1 1/2 x 6 x 9	3.6
SS-25	20	25	2 1/4 x 7 x 9 1/2	4.2
SS-30	25	30	3 1/4 x 7 x 9 1/2	5.0

## DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2 1/4 x 7 x 9 1/2	4.2
SS-30M*	25	30	3 1/4 x 7 x 9 1/2	5.0

## RACKMOUNT SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-10	7	10	3 1/2 x 19 x 9 1/2	4.3
SRM-12	10	12	3 1/2 x 19 x 9 1/2	4.7
SRM-18	15	18	3 1/2 x 19 x 9 1/2	5.0
SRM-25	20	25	3 1/2 x 19 x 9 1/2	6.5
SRM-30	25	30	3 1/2 x 19 x 9 1/2	7.0

## WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3 1/2 x 19 x 9 1/2	6.5
SRM-30M	25	30	3 1/2 x 19 x 9 1/2	7.0

## 2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3 1/2 x 19 x 9 1/2	10.5
SRM-30-2	25	30	3 1/2 x 19 x 9 1/2	11.0

## WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3 1/2 x 19 x 9 1/2	10.5
SRM-30M-2	25	30	3 1/2 x 19 x 9 1/2	11.0



MODEL SRM-30



MODEL SRM-30M-2



MODEL SS-12SM/GTX



MODEL SS-10EFJ-98

## CUSTOM POWER SUPPLIES FOR RADIOS BELOW

EF JOHNSON AVENGER GX-MC41  
EF JOHNSON AVENGER GX-MC42  
EF JOHNSON GT-ML81  
EF JOHNSON GT-ML83  
EF JOHNSON 9800 SERIES  
GE MARC SERIES  
GE MONOGRAM SERIES & MAXON SM-4000 SERIES  
ICOM IC-F11020 & IC-F2020  
KENWOOD TK760, 762, 840, 860, 940, 941  
KENWOOD TK760H, 762H  
MOTOROLA LOW POWER SM50, SM120, & GTX  
MOTOROLA HIGH POWER SM50, SM120, & GTX  
MOTOROLA RADIUS & GM 300  
MOTOROLA RADIUS & GM 300  
MOTOROLA RADIUS & GM 300  
UNIDEN SMH1525, SMU4525  
VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

## NEW SWITCHING MODELS

SS-10GX, SS-12GX  
SS-18GX  
SS-12EFJ  
SS-18EFJ  
SS-10-EFJ-98, SS-12-EFJ-98, SS-18-EFJ-98  
SS-12MC  
SS-10MG, SS-12MG  
SS-10IF, SS-12IF  
SS-10TK  
SS-12TK OR SS-18TK  
SS-10SM/GTX  
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX  
SS-10RA  
SS-12RA  
SS-18RA  
SS-10SMU, SS-12SMU, SS-18SMU  
SS-10V, SS-12V, SS-18V

Circle 2 on Fast Fact Card or visit [freeproductinfo.net/mrt](http://freeproductinfo.net/mrt)





# COMMUNICATIONS SPECIALISTS, INC.

**LEADING THE WORLD IN ADD-ON  
TONE SIGNALING PRODUCTS**

**FOR OVER 30 YEARS**

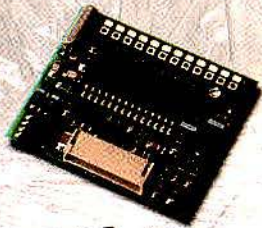
- ▶ One Year Warranty on all products
- ▶ Order Factory Direct – No Minimums
- ▶ Same day shipping on most orders
- ▶ Toll free voice and fax for easy ordering
- ▶ 24 hour "InfoFax" and website application notes for around-the-clock tech support

**NOW MORE THAN EVER, YOUR BEST SOURCE  
FOR QUALITY TONE SIGNALING PRODUCTS!**

WE'RE PLEASED TO ANNOUNCE THE ACQUISITION OF THE

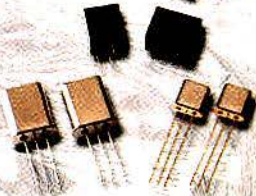
**Selectone**

LINE OF TONE SIGNALING AND ENCRYPTION PRODUCTS,  
TO BETTER FULFILL YOUR TONE SIGNALING REQUIREMENTS



## DCS-23

Digital Coded Squelch Encoder-Decoder  
Jumper Programmable to all 106 DCS codes.  
1.36" x 1.18" x 0.25"  
\$59.95



## FILTERS

Call us for the lowest cost, 12.5kHz channel spacing,  
exact replacement crystal and ceramic IF filters for  
part 90 Refarming. Complete kits available for  
most popular radios at \$15.00 to \$25.00/kit.



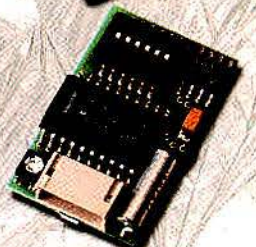
## ID-8

Automatic Morse Station Identifier  
Meets all FCC ID requirements.  
Fully field programmable with included keypad.  
1.85" x 1.12" x .35"  
\$69.95



## PE-1000

Desktop Paging Encoder  
Two-Tone Sequential.  
Other formats and custom tones available.  
7.5" x 7.8" x 2.7"  
\$224.95



## SS-64

CTCSS Encoder  
Microminiature, DIP switch programmable.  
Includes 64 tones from 33.0 to 254.1 Hz.  
0.66" x 1.08" x 0.21"  
\$28.95



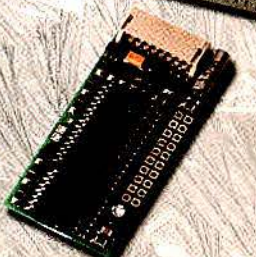
## TE-32

Multi-tone CTCSS Encoder  
Rotary dial switchable to any of the standard 32 EIA tones.  
5.25" x 3.3" x 1.7"  
\$49.94  
TE-32D with LED display, \$99.95



## TP-3200

Shared Repeater Tone Panel  
Full featured and with all 157 CTCSS/DCS codes.  
Desktop and rack mounted versions.  
\$279.95



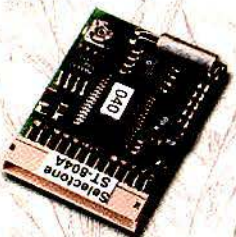
## TS-64

CTCSS Encoder-Decoder  
Microminiature jumper programmable.  
Includes 64 tones from 33.0 to 254.1 Hz.  
0.78" x 1.70" x 0.25"  
\$54.95 (model TS-64DS with DIP switch, \$57.95)



## ST-20, 25, 50

Voice Encryption Units  
PRIVATE COLLECTION™ series provides low to high level  
security for two-way radio voice applications.  
PC programmable with optional kit.  
0.9" x 1.5" x 0.25"  
\$79.00 - \$299.00



## ST-804A

Multi Format Encoder  
Encodes Two-Tone Sequential, Burst Tone,  
or DTMF ANI/ENI Formats.  
PC programmable with optional kit,  
or factory programmed for free.  
1.15" x 0.84" x 0.15"  
\$59.95



## ST-809B

Multi Output DTMF Decoder  
Decodes address codes of 1 to 7 digits from  
all 16 DTMF characters.  
Multiple outputs and remote reset capability.  
PC programmable with optional kit, or factory  
programmable for free.  
1.34" x 0.85" x 0.21"  
\$59.95



## ST-888

Desktop ANI Decoder / Display Unit  
Use with ST-804A or other DTMF ANI encoders for  
monitoring of fleet radio users and control systems.  
\$499.00



**COMMUNICATIONS SPECIALISTS, INC.**

426 WEST TAFT AVENUE • ORANGE, CA 92865-4296  
(714) 998-3021 • FAX (714) 974-3420  
ENTIRE U.S.A. (800) 854-0547 • FAX (800) 850-0547  
<http://www.com-spec.com>